# BIBLIOGRAPHY OF ARTHROPOD CHEMOSTERILANTS

ARS-S-93 May 1976

RETURN TO GOV. DOCS. CLERK

AGRICULTURAL RESEARCH SERVICE . U.S. DEPARTMENT OF AGRICULTURE

# CONTENTS

Pa	ge
ntroduction	1
ibliography	2
ndex of authors	43
ndex of arthropods evaluated with chemosterilants	54
ndex of other animals and plants evaluated with chemosterilants	56

## BIBLIOGRAPHY OF ARTHROPOD CHEMOSTERILANTS

By Richard L. Fye and G C LaBrecque<sup>1</sup>

## INTRODUCTION

Interest in the possibility of using chemosterilants to control pests is wide-spread, and research in the field continues to expand. Much progress has been made in the chemical, biological, and toxicological evaluation of chemosterilants since the term was coined by G. C. LaBrecque in 1961 (see item 797 in the bibliography). We compiled this bibliography to organize some of this wealth of information, and we hope that it will serve as a basis for continuing research and as a guide to new workers in the field.

This bibliography contains all published research on chemosterilants through March 1974. We recognize that in a compilation of this nature some pertinent publications may have been overlooked. References are listed by author(s) and chronologically in multiple entries by the same author(s). Entries 35–68, lacking a specific author, are cited chronologically under "Anonymous."

We have included an index of authors, an index of arthropod species affected by chemosterilants, and an index of other animals and plants evaluated with chemosterilants. The latter two indexes cover only the references that we examined (about 75 percent) and subjects that could be inferred from reference titles. The enormous number of chemosterilants and compounds tested as chemosterilants prevented inclusion of an index of chemosterilants.

<sup>&</sup>lt;sup>1</sup>Agricultural research technician and entomologist, Insects Affecting Man Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Gainesville, Fla. 32604.

### BIBLIOGRAPHY

#### A

- Abasa, R. O., and Hansens, E. J. 1969. An apholateresistant strain of houseflies. I. Resistance to other chemosterilants and to insecticides. J. Econ. Entomol. 62: 334-338
- Abdellatif, M A. 1971. Biological evaluation of chemosterilants, apholate and metepa, on spider mites, Tetranychus cinnabarinus. Angew. Entomol. 67: 143-148.
- Abdel-Malek, A. A. 1963. Inhibitory effect of L-methionine-methyl-<sup>14</sup>C on oviposition by females of the cotton leafworm, *Prodema lutura* (F.) induced by radioactive males. Nature (Lond.) 200: 604-605.
- and McE. Kevan, D K 1961. Inhibited oviposition by females of *Gryllus assimilis* (F.), induced by radioactive males, using L-methionine-methyl-<sup>14</sup>C. Nature (Lond.) 192: 681-682.
- Abdel-Megeed, M. I., and Zidan, Z. H. 1973. Effect of methiotepa on the reproduction of the spiny bollworm, Earnas insulana (Boisd.). Angew. Entomol. 74: 206-210.
- Aboul-Nasr, A. E., El-Ibrashy, M. T., and Shehata, N. F. 1971. Laboratory studies on the sterilization of the Egyptian cotton leafworm, Spodoptera lattoralis Boisduval, with certain sterilizing compounds (Lepidoptera: Noctuidae). Appl. Entomol. Zool. 6: 210-212.
- Adam, H. 1971. Comparative studies on the application of x-irradiation and chemosterilants to the reproduction system of Rhagoletis cerasi. Acta Phytopathol. 6(1-4): 281-285.
- Addy, N. D. 1971. Some cytological changes in the fat body and testes of male spruce budworm (Choristoneura fumiferana Clem.) pupae after treatment with tepa, Can. J. Zool. 49: 831-836.
- Adkıns, T. R., Jr. 1964–65. Face fly control with a chemosterilant. Agric. Res. (Clemson Univ.) 11(2): 5–18.
- Adkisson, P. L., and Wellso, S. G. 1962. Effect of DDT poisoning on the longevity and fecundity of the pink bollworm. J. Econ. Entomol. 55: 842-845.
- Adler, I. D., Ramarao, G., and Epstein, S. S. 1971.
   In vivo cytogenetic effects of trimethylphosphate and of TEPA on bone marrow cells of male rats. Mutat. Res. 13: 263-273.
- Adolphi, H. 1965. Chemosterilants in pest control. Z. Angew. Zool. 52; 133-143. [In German.]
- Ahmad, A. J., and Mohammed, A. 1969. Insect population control by sterile male technique. Nucleus (Karachi) 6: 21–33.
- Ahmad, I. 1971. Chemical sterilization of Dysdercus cingulatus Fabr. Botyu-Kagaku 36: 101-104.
- 15. ———. 1971. Mating vigour and sexual competitiveness of chemosterilized males of *Dysdercus cingulatus* Fabr. Botyu-Kagaku 36: 99–100.
- Ailam, G., and Galun, R. 1967. Optimal sex ratio for the control of insects by the sterility method. Ann. Entomol. Soc. Amer. 60; 41-43.
- Akov, S. 1965. Inhibition of blood digestion and oocyte growth in *Aedes aegypti* by 5-fluorouracil. Biol. Bull. 129: 439-453.
- 18. \_\_\_\_\_. 1966. Retention of the blood-meal in Aedes aegypti

- following sterilization by chemicals and irradiation. Ann Trop. Med. Parasitol. 60: 482-494.
- 1967 Effect of folic acid antagonists on larval development and egg production in Aedes aegypti J. Insect Physiol. 13, 913-923.
- , and Borkovec, A. B. 1968. Metabolism of the chemosterilant hempa by carbamate-resistant houseflies Life Sci. Part II, Biochem. Gen. Mol. Biol. 7: 1215-1218.
- 21 ——, Oliver, J. E., and Borkovec, A. B. 1968.

  N-Demethylation of the chemosterilant hempa by housefly microsomes. Life Sci. Part II: Biochem. Gen. Mol. Biol. 7, 1207–1213.
- Al-Adil, K. M., Kilgore, W. W., and Painter, R. R. 1972.
   Housefly lipids and the effect of chemosterilization with metepa. J. Econ. Entomol. 65: 887–888.
- Al-Dabagh Khudairi, S. Y., and Ruber, E. 1974. Survival and reproduction of ostracods as affected by pesticides and temperature. J. Econ. Entomol. 67: 22–24.
- Alekseev, A. N., Avdeeva, E. V., Turnov, I. S., and Tokareva, T. G. 1971. Chemical sterilizing action of fluoroorganic compounds on larvae and adult fleas —ectoparasites of rodents. Med. Parazitol. Parazit. Bolezn. 40: 28-32, [In Russian.]
- Alexander, M. L., and Glanges, E. 1965. Genetic damage induced by ethylenimine. Proc. Natl. Acad. Sci. 53: 282-288.
- Alexander, P. 1960. Radiation-imitating chemicals. Sci. Amer. 202: 99-108.
- 27. Citation deleted.
- Alonso, C. 1971. The effects of gibberellic acid upon developmental processes in *Drosophila hydei*. Entomol. Exp. Appl. 14: 73-82.
- Altman, R. M. 1963. The effects of tepa on Plasmodium gallinaceum in Aedes aegypti. Amer. J. Hyg. 77: 221 227
- Ambrose, A. M. 1950. Toxicological studies of compounds investigated for use as inhibitors of biological processes. I. Toxicity of vinyl propionate. Arch. Indus. Hyg. Occup. Med. 2: 582-590.
- 1950. Toxicological studies of compounds investigated for use as inhibitors of biological processes. II.
   Toxicity of ethylene chlorohydrin. Arch. Indus. Hyg. Occup. Med. 2: 591–597.
- 1951. Toxicologic studies of compounds investigated for use as inhibitors of biologic processes. III.
   Toxicity of propylene glycol dipropionate. Arch. Indus. Hyg. Occup. Med. 3: 48-51.
- 33. Ameresekere, R. V. W. E., and Georghiou, G. P. 1971. Sterilization of the beet leafhopper; Induction of sterility and evaluation of biotic effects with a model sterilant (OM-53139) and <sup>60</sup>Co irradiation. J. Econ. Entomol. 64: 1074–1080.
- Georghiou, G. P., and Sevacherian, V. 1971. Histopathological studies on irradiated and chemosterilized beet leafhoppers, Circulifer tenellus. Ann. Entomol. Soc. Amer. 64: 1025–1031.
- Anonymous, 1958. Comparative clinical and biological effects of alkylating agents. Ann. N.Y. Acad. Sci. 68: 657-1266.
- 86. ——. 1960. Propylene imine. Interchem. New Prod. Bull. 106R, 37 pp.

- 1961 Focusing on new insect control methods
   Chem. Week 88(11): 95-96, 98-99
- ——, 1962. Experimental insect sterilant No. 2174—apholate Olm Mathieson Chem Corp Circ (Feb.), 2 pp.
- 39 \_\_\_\_\_, 1962, World Crops 14 209
- 40. ——. 1962 Bonus from chemical sterilants, Agric. Res
- 1963. Research on controlling insects without conventional insecticides. U.S. Dep. Agric, Agric. Res. Serv [Rep.] No. ARS-22-85, 23 pp.
- 42. ———. 1963. Apholate combats msects. Agric. Res. 11(9): 3-4.
- 1964. Two new chemosterilants show promise for insect control. Chem. Week 94(5), 56.
- 1964. A new class of chemosterilants, triphenyl tins. Chem. Week 95(4): 64.
- 1963. Insect population conrol by the sterile-male technique. In A. W. Lindquist(ed.), IAEA Tech. Rep. Ser. No. 21, 1-58 pp.
- 46, Citation deleted.
- 47. ——, 1965 Scientists rank chemosterilants. Agric. Res. 14(1): 16,
- 48. . 1965. Pink bollworms. Agric. Res. 14(3): 7.
- 1965. Chemosterilants—Now effective against screwworms. Agric. Res. 14(5): 13.
- 1966. Pink bollworm sterilization tests reported by USDA scientist U.S. Dep. Agric. Press Release.
- 1966. A new concept Total insect population suppression. Agric. Res. 14(9); 3-5.
- 1966. Results of experiments with insect chemosterilants, J. Jap. Insect Steril. Assoc., 78 pp.
- 1966. Laboratory training manual on the use of isotopes and radiation in entomology. IAEA Tech. Rep. Ser. No. 61., 144 pp.
- 1966. Pest control by chemical, biological, genetic, and physical means. U.S. Dep. Agric., Agric. Res. Serv., [Rep.] No. ARS-33-110, 214 pp.
- 1966. Black light lures insects to chemical sterilant, reduces reproduction. USDA Press Release 820-866, April 1.
- 1967–1968. Results of experiments with insect chemosterilants. J. Jap. Insect Steril. Assoc., 251 pp.
- 1968, Isotopes and radiation in entomology. Proc. Symp. Joint IAEA/FAO, Vienna (Dec. 4-8, 1967), 428 pp.
- 1968. Control of livestock insect pests by the sterile-male technique. Proc. Joint FAO/IAEA, Vienna (Jan. 23-27, 1967), 102 pp.
- 1968. Insect chemosterilants. Nat. Hist. Rep. 68, 1 p.
- 1969. Fly birth control III. Nat. Hist. Surv. Rep. No. 81.
- 62. . 1970. Chemical sterilization of male mosquitoes reduced the pest population level by 97%. Chem. Eng. News 48(33): 51.
- 63. ———, 1970. Application of induced sterility for control of Lepidopterous populations. Proc. Joint FAO/IAEA, Vienna (June 1–5, 1970), 169 pp.
- 1971. New ways to fight pests: Alternatives to pesticides. U.S. Dep. Agric., Agric. Inf. Bull. No. 351, pp. 31-40.

- 1971 Sternbty Principle for Insect Control or Eradication. Proc Joint FAO/IAEA, Athens (Sept. 14-18, 1970), 542 pp.
- 67. . 1973 Chemosterilant might work with rodent bait Pest Control 41(4); 68.
- 68 . 1974 "Male only" houseflies. Agric Res. 22(11)
- 69 Ansarı, M A. 1972. Mating vigour and sexual competitiveness of chemosterilized males of Musca domestica nebulo Fabr. Botyu-Kagaku 37: 125-129.
- 1973. Chemosterilant resistance in Musca domestica nebulo Fabr. WHO/VBC/73,456, 13 pp.
- 1973 Effects of chemosterilants on the development and fertility of the housefly, Musca domestica nebulo Fabr. Botyu-Kagaku 38, 1-5.
- 1973. Development of sterility through pupal treatments in Musca domestica nebulo Fabr. Botyu-Kagaku 38; 125,
- 1973. Permanency of sterrlity effects of chemosterilants in Musca domestica nebulo Fabr. Botyu-Kagaku 38; 129.
- 1973. Resistance spectrum of alkylating and nonalkylating compounds in *Musca domestica nebulo* Fabr. Botyu-Kagaku 38: 143.
- and Khan, M. A. 1973. Effect of triphenyltin acetate on the fecundity and fertility of *Dysdercus cingulatus* F. Curr. Sci. 42: 280-281.
- and Khan, N. H. 1971. The effect of hempa on the sterility and longevity of normal and DDT resistant strains of Musca domestica nebulo Fabr. Botyu-Kagaku 36: 37-40.
- and Wadhwani, K. M. 1972. Mating competitiveness of normal and chemosterilized males of melon fly, Dacus cucurbitae (Coquillett). Botyu-Kagaku 37: 41–43
- Artem'ev, V. P., Oleshchenko, I. N., and Gaidarov, P. G. 1971. Effect of sterilization of *Eurygaster* on entomophages. Zashch. Rast. 16: 24–25. [In Russian]
- Artyukhina, I. N. 1972. Methods of registration and criteria for evaluating the population density of Blattella germanica L. Med. Parazitol. Parazit. Bolezn. 41: 472-477.
- Ascher, K. R. S. 1957. Prevention of oviposition in the housefly through tarsal contact agents. Science 125: 938-939.
- 81. ———, 1959. Di-(p-chlorophenyl) compounds and oviposition in the housefly. Riv. Parassitol. 20: 143-144.
- 1962. Two new research approaches to the resistance problem, using the housefly as experimental animal. J. Hyg. Epidemiol. Microbiol. Immunol. 6: 256–264.
- 1964. Oviposition-inhibiting agents: A screening for simple model substances. Proc. XII. Congr. Entomol., London (July, 1964), 514 pp.
- 1964. A review of chemosterilants and oviposition-inhibitors in insects, World Rev. Pest Control 3(Part 1); 7-26,
- 1965. Oviposition-inhibiting agents: A screening for simple model substances. Int. Pest Control Jan/Feb: 1-4.
- 86. ——, 1967. Essay review. Insect chemosterilants by

- A B. Borkovec. World Rev. Pest Control 6: 90-95.
- 87. —— 1969. Insect pest control by chemosterilization and other advanced methods (antifeedants, microbial pesticides, etc.). (Third generation insecticides Magdeburg 1966 to Milan 1969). 3ème Congrès Internazional des Antiparasitaires, Milan (Oct. 6–8, 1969), pp. 77–98.
- 1970. Insect pest control by chemosterilants and antifeedants—Magdeburg 1966 to Milan 1969. World Rev. Pest Control 9, 140–155.
- and Avdat, N. 1966. Sterilizing the male housefly with m-xylohydroquinone, Part 1. Int. Pest Control 8: 16-25.
- and Avdat, N. 1967. Stabilization of aqueous solutions of the insect chemosterilant m-xylohydroquinone (m-XHQ) by vitamin C. Experientia 23: 679-680.
- 91. ——, and Avdat, N. 1967. Sterilizing the male housefly with m-xylohydroquinone, Part 2. Experientia 9: 8-9, 11-13
- Avdat, N., Meisner, J., and Moscowitz, J. 1971.
   The effect of fentins on the fertility of the female housefly. Incorporating a review of their influence on insect fertility and fecundity in general. Angew. Entomol. 69: 285-302.
- , and Hirsch, I. 1961. Inhibition of oviposition in the housefly by ingestion of acaricides (ovicides). Riv. Malar. 40: 139-145.
- and Hirsch, I. 1963 The effect of m-xylohydroquinone on oviposition in the housefly. Entomol. Exp. Appl. 6; 337-338.
- Meisner, J., and Nissim, S. 1968. The effect of fentins on the fertility of the male housefly. World Rev. Pest Control 7: 84-96.
- and Moscowitz, J. 1968. Fentins (triphenyltins)
  have an antifeedant effect for housefly larvae. Int.
  Pest Control 10: 10-13.
- 97. ——, and Nissim, S. 1964. Organotin compounds and their potential use in insect control. World Rev. Pest Control 3; 188-211.
- Auerback, C. 1958. Mutagenic effects of alkylating agents. Ann. N.Y. Acad. Sci. 68; 781.
- and Robson, J. M. 1942. Experiments on the action of mustard gas in *Drosophila*. Production of sterility and of mutation. Rep. Min. Supply, Great Britain, W3979
- Austin, C. R. 1965. Fertilization. 145 pp. Prentice-Hall, Inc., Englewood Cliffs, N.J.
- 101. Citation deleted.
- 102. Azaryan, G. Kh., Babayan, A. S., Mkrtumyan, K. L., Meklonian, T. M., and Kropatcheva, A. A. 1968. Some results of chemical sterilant tests with some injurious species of Lepidoptera in the Armenian SSR. [Abstr.] 13th Int. Congr. Entomol., Moscow, 1968; 19.

#### B

103. Babayan, A. S., and Mkrtumyan, K. L. 1971. Results of testing of chemosterilants against codling moth and a melon fly. In Kishinev (ed.), Biological Methods of Protecting Fruit and Vegetable Crops from Pests, Diseases, and Weeds as Bases for Integrated Systems, pp. 146-147. V.I. Lenin Academy of Agricultural Sciences, Leningrad.

- 104. Baccetti, B. 1965. Tsetse flies. Mass rearing and chemosterilization. IAEA Tech. Rep. Ser. 44, p. 34.
- Badger, G. M. 1962. The chemical basis of carcinogenic activity. 72 pp Charles C. Thomas Publisher, Springfield. Ill.
- 106. Badmin, J. S. 1971. Chemosterilant effects on the larval post-embryonic development of the stable fly, Stomoxys calcitrans (L.). In Symp. Steril. Princ. Insect Control Erad. Proc. IAEA Proc. Ser. STI/PUB/265, pp. 229-240.
- 107. Baker, B. R., and Ho, B. T. 1965. Analogues of tetrahy-drofolic acid. XXX. Inhibition of dihydrofolic reductase by some 6-substituted 2,4-diamino-s-triazines (1,2). J. Heterocycl. Chem. 2: 340–343.
- 108. ——, Lee, W. W., Skinner, W. A., Martinez, A. P., and Tong, E. 1960. Potential anticancer agents—L. Nonclassical antimetabolites. II. Some factors in the design of exo-alkylating enzyme inhibitors, particularly of lactic dehydrogenase. J. Med. Pharm. Chem. 2: 633-657.
- Baldwin, R. W., Partridge, M. W., and Stevens, M. F. G. 1966. Pyrazolotriazines: a new class of tumourinhibitory agents. J. Pharm. Pharmacol. 18(Suppl.): 18-48.
- Balser, D. S. 1967. Management of predator population with antifertility agents. J. Wild. Manage. 28: 352-358.
- 111. Banik, U. K., Tanikella, T., and Rakhit, S. 1972. Oral antifertility effects of halo propanediol derivatives in male rats. J. Reprod. Fertil, 30: 117-124.
- Barlow, F. and Turner, C. R. 1967. The residual properties of some chemosterilants, Pest Artic. News Sum. Sect. A. Insect Control 13: 77-81.
- Barnes, J. M. 1964. A symposium on chemosterilants in pest and vector control. III. Toxic hazards and the use of insect chemosterilants. Trans. R. Soc. Trop. Med. Hyg. 58: 327-332.
- 114. Barnes, J. R., Fellig, J., and Mitrovic, M. 1969. The chemosterilant effect of anthramycin methyl ether in *Drosophila melanogaster*. J. Econ. Entomol. 62: 902-904.
- 115. Baroche, C. 1968. Effects of thalidomide on *Drosophila*: Development and tumorigenesis. Comparison with potassium phthalate and some non-phthalate compounds. Bull. Cancer (Paris) 55: 413–428.
- Barsoum, H. 1955. The effect of colchicine on the spermatogenesis of rabbits. J. Pharmacol. 115: 319-322.
- 117. Bartlett, A. C., and Mitlin, N. 1967. Development and reproductive effects of heavy water (D<sub>2</sub>0) in the diet of the boll weevil. J. Econ. Entomol. 60: 647.
- 118. Barton, A. A., and Barton, M. 1965. Electron microscope studies on the effect of thiotepa on the cytoplasm of fibrosarcoma cells in tissue culture. Brit. J. Cancer 19: 527–530.
- Bateman, A. J., and Jackson, H. 1958. Mutagenic action of TEM. Annu. Rep. Brit. Emp. Cancer Campaign, p. 473.
- and Chandley, A. C. 1964. Sensitivity of the male germ cells of *Drosophila* to methyl methanesulphonate. Heredity (Lond.) 19: 711-718.
- 121. Bateman, M. A., Friend, A. H., and Hampshire, F. 1966. Population suppression in the Queensland fruit fly, Dacus (strumeta) tryoni. I. The effects of male depletion in a semi-isolated population. Aust. J. Agric. Res.

- 17: 687-697.
- Batra, K. B., and Hakim, S. 1956. The effect of meta-xylohydroquinone on mice and rats. J. Endocrin. 14: 228-233.
- 128. Baumhover, A. H., Graham, A. J., Bitter, B. A., Hopkins, D. E., New, W. D., Dudley, F. H., and Bushland, R. C. 1955. Screwworm control through release of sterilized flies, J. Econ. Entomol. 48: 462–466.
- Beard, R. L. 1965. Ovarian suppression by DDT and resistance in the housefly (Musca domestica L.). Entomol. Exp. Appl. 8: 193-204
- 125. Beattie, G. A. C., Borkovec, A. B., and McDonald, F. J. D. 1972. Chemosterilization of Lucilia cuprina with N,N'-Hexamethylenebis-(1-aziridinecarboxamide). J. Econ. Entomol. 65: 1352-1354.
- 126. Beavers, J. B., Hampton, R. B., Toba, H. H., and Moreno, D. S. 1971. Some effects of gamma irradiation or the chemosterilant, tepa, on the citrus red mite and its progeny. J. Econ. Entomol. 64: 72-75.
- Benes, V., and Sram, R. J. 1969. Mutagenic activity of some pesticides in *Drosophila melanogaster*. Ind. Med. Surg. 38: 442-444.
- Benkwith, K. B., Jr., and Graves, J. B. 1970. Evaluation of selected chemosterilants against the tobacco budworm. J. Econ. Entomol. 63: 984-986.
- 129. Bennett-Rezabova, B., and Turner R. B. 1970. Effect of chemosterilants in vivo and in vitro on respiration of ovarian mitochondria of the housefly Musca domestica L. Acta Ent. Bohemoslov. 67: 65-69.
- Benschoter, C. A. 1966. Reserpine as a sterilant for the Mexican fruit fly. J. Econ. Entomol. 59: 333-334.
- 131. ——, 1967. Effect of dietary biotin on reproduction of the housefly. J. Econ. Entomol. 60; 1326–1328.
- , and Paniagua, R. G. 1966. Reproduction and longevity of Mexican fruit flies, Anastrepha ludens (Diptera: Tephritidae), fed biotin in the diet. Ann. Entomol. Soc. Amer. 59: 298–300.
- Bergner, A. D. 1950. Studies on colchicine derivatives.
   III. Effect on mitotic activity of mouse spermatogonia. Cancer 3: 134-141.
- 134. Berin, Ye. G. 1969. The genetic effect of N-nitrosomethylurea on various stages of spermatogenesis in *Drosophila melanogaster* (Diptera: Drosophilidae). Vest. Akad. Navuk USSR Ser. Biyal. Navuk (Russ.) 1: 78-81.
- Berndt, K. P. 1970. Chemosterilantien gegen Krankheitsubertrager. Angew. Parasitol. 11: 3.
- and Groth, U. 1971. Protophorma terraenovae (R.-D.) (Diptera: Calliphoridae) as a test object in chemosterilant research. Biol. Zentralbl. 90: 217-222.
- Beroza, M. 1965. Agents affecting fertility. Biological Council, Symposium on Drug Action, London, p. 148.
- 138. ——, and Borkovec, A. B. 1964. The stability of tepa and other aziridine chemosterilants. J. Med. Chem. 7: 44–49.
- 189. \_\_\_\_\_, and LaBrecque, G. C. 1967. Chemosterilant activity of oils, especially oil of Sterculia foetida, in the housefly. J. Econ. Entomol. 60: 196–199.
- Berryman, A. A. 1967. Mathematical description of the sterile-male principle. Can. Entomol. 99: 858–865
- 141. Bertram, D. S. 1963. Observations on the chemosterilant effect of an alkylating agent, thio-tepa, on wild-caught Anopheles gambiae var. Melas (Theo.) in Gambia, West Africa, and on laboratory-bred A. g. Gambiae

- Giles and Aedes aegypti (L.). Trans. Roy. Soc Trop. Med Hyg. 57 322-335.
- 142 . 1964. A symposium on chemosterilants in pest and vector control. Trans. Roy Soc. Trop. Med Hyg. 58: 295–334
- 143. —— 1964. Entomological and parasitological aspects of vector chemosterilization. Trans. Roy. Soc. Trop. Med. Hyg. 58, 296–317
- 144. ——, Srivastava, S. C., and Msangi, A. S. 1964. Transmission of *Plasmodium gallinaceum* Brumpt to chicks by *Aedes aegypti* (L.) sterilized by an alkylating agent, thiotena. J. Trop. Med. Hyg. 67: 51-57.
- 145 Bhalla, O. P., and Robinson, A. G. 1966. Effect of three chemosterilants on the pea aphid fed on an artificial diet. J. Econ. Entomol. 59: 378-379.
- 146. ——, and Robinson, A. G. 1968. Effects of chemosterilants and growth regulators on the pea aphid fed an artificial diet. J. Econ. Entomol. 61; 552-555.
- 147. Bhanu, D. 1961. Modification in the fecundity and life span of the moth Corcyra cephalonica Staint. receiving dietary antibiotics in the larval stages. Experientia 17: 468.
- Bhatnagar-Thomas, P. L. 1973. Control of insect pests of stored grains using a juvenile hormone analog. J. Econ. Entomol. 66: 277-278.
- 149. Bichuk, Yu. P. 1971. Morphological changes in the gonads of the common beet weevil under the influence of some chemosterilants. In Kishinev (ed.), Biological Methods of Protecting Fruit and Vegetable Crops from Pests, Diseases, and Weeds as Bases for Integrated Systems, pp. 147–148. V. I. Lenin Academy of Agricultural Sciences, Leningrad.
- 150. Bing, T. 1965. A preliminary observation on the mechanism of sterilization of the houseflies (Musca vicina Macquart) treated with thio-tepa. Acta Entomol. Sin. 14: 250-254.
- Bird, M. J. 1950. Production of mutations in *Drosophita* using four aryl-2-halogenoalkylamines. Nature (Lond.) 165: 491–492.
- 152. Block, J., and Jackson, H. 1957. The action of triethylenemelamine on the fertility of male rats. Brit. J. Pharmacol. 12: 1-7.
- 153. Bonnemaison, M. L. 1966. Possibilities et conditions generales d'emploi des chimiosterilisants contre les arthropodes. Seance, Janvier 1966: 137-143.
- 154. ——. 1966. Essais de substances chimiosterilisantes. I. Action sur divers homopteres et coleopteres. Phytiat. Phytopharm. 15: 59-74.
- 155. \_\_\_\_\_\_. 1966. Essais de substances chimiosterilisantes. II.
   Action sur divers Lepidopteres. Phytiat. Phytopharm. 15: 79-92.
- 156. ——. 1968. Action sterilisante du tepa et du D.M.S.O. sur divers insectes. Phytiat. Phytopharm. 2: 105-118.
- 157. ——. 1969. Essais de chimiosterilisants sur quelques Homopteres, Coleopteres et Lepidopteres. 3ème Congrès Internazional des Antiparasitaires, Milan (Oct. 6-8, 1969), pp. 189-197.
- 158. Boone, I. U., Rogers, B. S., and Williams, D. L. 1962. Toxicity, metabolism, and tissue distribution of carbon-14-labeled N. N', N''-triethylene-thiophosphoramide (thiotepa) in rats, Toxical Appl Pharmacol, 4; 344.
- 159. Boris, A., DeMartino, L., and Trmal, T. 1974 sterility in the male rat after a sing

- pipecolmomethyl hydroxymdane, J. Reprod Fertil 37: 441-442
- 160. Borkovec, A. B. 1962. Sexual sterilization of insects by chemicals, Science 137 1034-1037
- —. 1962 The chemistry of insect chemosterilants. Proc. Fla. Entoniol. Confer., Gamesville, pp. 9-11.
- 162 --. 1964 Insect chemosterilants: Their chemistry and application. Residue Rev. 6; 87-103.
- 163. —. 1965. The chemistry and properties of insect chemosterilants Proc XII Int Congr. of Entomol. London, Sec. 8, pp 514-515
- -. 1965. New chemical approaches to insect control Proc. 3d Brit Insectic, Fungic Conf., Brighton, England, pp 3-17.
- 165 - 1966 Insect chemosterilants. Adv. Pest Control Res. 7, 143 pp
- 166. -- 1967 Recent advances in the chemistry of insect chemosterilants, Proc. 6th Int. Congr. Plant Prot., 1967, p. 154
- 167. —. 1968. Chemosterilants in entomology and sterile male technique. In Isotopes and Radiation in Entomology, Proc Symp FAO/IAEA, Vienna (Dec. 4-8, 1967), pp. 201-208
- 168. ---. 1969. Alkylating agents as insect chemosterilants Ann. N.Y Acad. Sci. 163, 860-868.
- 169. ---—. 1969. Chemosterilants in pest control. Atti Accad. Naz. Lincei, 1969, 128: 249-253.
- chemosterilants. Environ Mutagen Soc. Newsl. 1(3): 10-11.
- 171. ——. 1971. The role of the sterility technique in pest control. Isr. J. Entomol. 6 183-189.
- 1971. Biochemical Toxicology of Insecticides. 172. -R. D. O'Brien and T Yamamoto (eds.), J. Med. Chem. 14: 1146, Review.
- 173. ~ 1972. Chemosterilants for male insects. Pestic. Chem. Proc. 2d Int. Congr. Pestic. Chem., Tel Aviv, 1971, pp. 469-481.
- 174. - 1972. Workshop: Chemical induction of sterility in insects. Summary of discussions, Pestic. Chem. Proc. 2d Int. Congr. Pestic. Chem., Tel Aviv, 1971, pp. 495-496.
- 175. - 1972. Safe handling of insect chemosterilants in research and field use. U.S Dep. Agric., Agric. Res. Serv. [Rep.] No. ARS-NE-2, 13 pp.
- 176. - —. 1973. Initiating research on insect chemosterilants. Chemosterilant News (India) 1: 1-8.
- 177. ----, 1973. Insect chemosterilants as mutagens, In A. Holleander (ed.), Chemical Mutagens, Vol. 8, pp. 259-270. Plenum Press, New York.
- ---, Chang, S. C., and Horwitz, S. B. 1971. Chemo-178. sterilization of houseflies with anthramyon methyl ether, J. Econ. Entomol. 64; 983-984.
- ----, Chang, S. C., and Limburg, A. M. 1964. Effect of pH on sterilizing activity of tepa and metepa in male houseflies. J. Econ. Entomol. 57; 815-817.
- -, and DeMilo, A. B. 1967. Insect chemosterilants. V. Derivatives of melamine. J. Med. Chem. 10: 457-461.
- -, DeMilo, A. B., and Fye, R. L. 1972. Triazinyl 181. chemosterilants for the housefly: 2,4-diamino-striazines, J. Econ. Entomol. 65: 69-73.
- ---, Fye, R. L., and LaBrecque, G. C. 1968. Aziridinyl chemosterilants for houseflies. U.S. Dep. Agric.,

- Agric Res. Serv. [Rep.] No. ARS-33-129, 60 pp. 183. --LaBrecque, G. C , and DeMilo, A, B 1967 s-Triazme herbicides as chemosterilants of houseflies
- J Econ. Entomol 60: 893-894, —, Nagasawa, S., Nakayama, I., and Terry, P. H.
- 184, -1968. Sterilization of Callosobruchus chinensis by hexamethylphosphorothioic triamide J. Econ. Entomol. 61, 1295-1298,
- -, Nagasawa, S., and Shinohara, H. 1968. Sterilızation of the Azukı bean weevil, Callosobruchus chinensis, by metepa and hempa, J. Econ. Entomol. 61: 695-698,
- 186. --, and Settepani, J. A. 1969 Insect chemosteriants derived from boron, U.S. Pat. 3,463,851,
- 187. --, Settepani, J. A., LaBrecque, G. C., and Fye, R. L. 1969. Boron compounds as chemosterilants for houseflies. J. Econ Entomol. 62: 1472-1480.
- 188. -—, and Terry, P. H. 1965. Diamino- and triamino-s-triazines as chemosterilants for insects. U.S. Pat. 3.189.521.
- -, and Woods, C. W 1963. Aziridme chemosterilants. Sulfur-containing aziridines. Adv. Chem. Ser. No. 41, pp. 47-55.
- 190. --, and Woods, C. W. 1965. Insect chemosterilants. II. N-Carbamoyl-aziridines. J. Med. Chem. 8: 545-547.
- 191. —, Woods, C. W., and Brown, R. T. 1966. Insect chemosterilants. III. 1-Aziridinylphosphine oxides. J. Med. Chem. 9: 522-526.
- 192. ---, Woods, C. W., and McHaffey, D. G. 1972. Chemosterilants against the boll weevil. I. Aziridines. J. Econ. Entomol. 65, 1543-1546.
- 193. Boston, M. D., Patterson, R. S., and Lofgren, C. S. 1970. Screening of chemosterilants against the southern house mosquito Culex pipiens quinquefasciatus. Fla. Entomol, 53; 215-218.
- 194. Bowman, M. C., and Beroza, M. 1966. Gas chromatographic determination of trace amounts of the insect chemosterilants tepa, metepa, hempa, and apholate and the analysis of tepa in insect tissue, J. Assoc. Off. Anal. Chem. 49: 1046-1052.
- 195. Bracken, G. K., and Dondale, C. D. 1972. Fertility and survival of Achaearanea tepidariorum (Araneida: Therididae) on a diet of chemosterilized mosquitoes. Can. Entomol. 104: 1709-1712.
- 196. Brader-Breukel, L. M. 1970. Lutte contre Diparopsis watersi (Roths.) et Heliothis armigera (Hb.). Attraction sexuelle et chimiosterilisation. Coton Fibres Trop. 25; 505-508,
- 197. Branco, F. 1963. La chimiotherapie en oncologie Arq. Patol. 35; 187-207.
- 198. Bransby-Williams, W. R. 1971. A field release of male Culex pipiens fatigans sterilised by apholate. East Afr. Med. J. 48; 68-75.
- 199. Breeland, S. G., Jeffrey, G., Lofgren, C. S., and Weidhaas, D. E. 1974. Release of chemosterilized males for the control of Anopheles albimanus in El Salvador. I. Characteristics of the test site and the natural anopheline population. Amer. J. Trop. Med. Hyg. 23: 272-281.
- 200. Bridges, R. G., and Ricketts, J. 1968. The effect of 2-aminobutan-1-ols on the growth of the housefly (Musca domestica). Comp. Biochem. Physiol. 25: 383-400.

- Brockman, R. W., and Anderson, E. P. 1963. Pyridine analogues. In R. M. Hochster and J. H. Quastel [eds.], Metabolic Inhibitors, Vol. 1, pp. 239-285. Academic Press, New York.
- Brookes, P , and Lawley, P. E. 1964. Alkylating agents. Brit. Med. Bull. 20: 91–95.
- Brooks, J. E., and Bowerman, A. M. 1969. Chemosterilants in rodent control. Soap Chem. Spec., Oct.: 58-60, 62-64, 64-66, 82, 83.
- Brown, A. W. A. 1964. Tactics of insect control, particularly in medical entomology Can. Entomol 96 172-182
- Brown, J. R. 1972. Effect of dietary Kelthane on mouse and rat reproduction. Pestic. Chem. Proc. 2d Int. Congr. Pestic. Chem., Tel Aviv., 6: 531-548.
- Bryan, J. H. 1968. Results of consecutive matings of female Anopheles gambiae Species B with fertile and sterile males. Nature (Lond.) 218: 489.
- Buckley, S. M., Stock, C. C., Parker, R. P., Crossley, M. L., Kuh, E., and Seeger, D. R. 1951. Inhibition studies of some phosphoramides against sarcoma 180, Proc. Soc. Exp. Biol. Med. 78: 299-305.
- Buiatti, M., and Ronchi, V. N. 1963. Chromosome breakage by triethylene-melamine (TEM) in *Vicia faba* in relation to the mitotic cycle Caryologia 16: 397-403.
- Bull, D. L., and Borkovec, A. B. 1973. Metabolism of labeled carbon-14-hempa by adult boll weevils. Arch. Environ. Contamin. Toxicol. 1; 148-158.
- Bulyginskaya, M. A. 1965. On the control of some injurious lepidoptera by means of genital chemical sterilization. Entomol. Obozr. 44; 738-749. [In Russian.]
- —. 1971. Use of derivatives of ethylenimine for sexual sterilization of the codling moth (Laspeyresia pomonella L.). In Kishinev (ed.), Biological Methods of Protecting Fruit and Vegetable Crops from Pests, Diseases, and Weeds as Bases for Integrated Systems, pp. 149–150. V. I. Lenin Academy of Agricultural Sciences, Leningrad.
- activity of the male codling moth Carpocapsa pomonella sterilized by different methods. Byull. Vses. Nauchno Issled. Inst. Zashch. Rast. 26: 24-26. [In Russian.]
- ——, and Bogdanova, T. P. 1971. Experiment on the release of sterilized males of the codling moth in a commercial orchard. In Kishinev (ed.), Biological Methods of Protecting Fruit and Vegetable Crops from Pests, Diseases, and Weeds as Bases for Integrated Systems, pp. 150–151. V. I. Lenin Academy of Agricultural Sciences, Leningrad.
- ——, and Bogdanova, T. P. 1971. Responses of both sterilized and non-sterilized males of the codling moth Laspeyresia pomonella to a sex attractant of their females. 1st Khemoretseptsiya Nasekomykh, Mater. Vses. Simp., pp. 185–189. [In Russian.]
- ——, and Gruzova, M. N. 1968. Chemical sterilization as a pest control method. [Abstr.] 13th Int. Congr. Entomol. Moscow, 1968, p. 41.
- ——, and Ivanova, T. V. 1968. Control of certain moths by chemical sterilization. Biol. Control Methods Plant Pests, Riga (USSR), pp. 309–314. [In Russian.]
- —, Ivanova, T. V., Iskvarina, S. S., and Chugunova, G. D. 1970. Action of chemosterilants on the competitive capacity of some male Lepidoptera. Entomol.

- Obozr. 49: 756-765. [In Russian.]
- 218 ,Ivanova, T. V., and Tshugumova, G. D. 1967. The effect of cytostatic substances upon gonads of some Lepidoptera Entomol. Obozr. 46, 569-582. [In Russian]
- 219. ——, Vronskikh, G. D., and Chebanov, G. E. 1972. Sexual chemical sterilization as a possible method of control of *Epidachna vigintioctomaculata* (Coleoptera, Coccinellidae). Entomol. Obozr. 51: 760–767. [In Russian.]
- Burden, G. S. 1966. Summary of major points from discussion of item 7. Seminar on Rodents and Rodent Ectoparasites, Geneva (Oct. 24-28, 1966). WHO/Vector Control/66.217; 211-212.
- and Smittle, B. J. 1968. Chemosterilant studies with the German cockroach. Fla. Entomol. 46 230-234.
- Busvine, J. R. 1971. A critical review of the techniques for testing insecticides. 345 pp. Common. Agric Bur., Farnham Royal, Slough, England.
- 223. Butt, B. A., Hathaway, D. O., and Howell, J. F. 1965. Codling moth sterile male release program at White Swan, Washington. U.S. Dep. Agric., Agric. Res. Serv., Entomol Res. Div. Spec. Rep. No. AADF1-65-1, 18 pp.
- 224. ——, Hathaway, D. O., White, L. D., and Howell, J. F. 1970. Field releases of codling moths sterilized by tepa or by gamma irradiation, 1964–1967. J. Econ. Entomol. 63; 912–915.
- Butylo, T. A. 1970. Chemical sterilizers and their prospective use for combatting apple worm. Zashch. Rast. (Kiev) 11: 25–28. [In Ukrainian.]
- 226. Byrdy, S., Ejmocki, Z., and Eckstein, Z. 1965. Organotin compounds as insect chemosterilants. Evaluation of the activity of some triphenytin derivatives on the Colorado potato beetle (Leptinotarsa decembineata Say) and housefly (Musca domestica L.). Bull. Acad. Polon. Sci. Ser. Sci. Chim. 13: 683-686.
- Ejmocki, Z., and Eckstein, Z. 1970. Insect chemosterilizing activity and chemical structure of some organotin derivatives. Bull. Acad. Polon. Sci. Ser. Sci. Biol. 18: 15-19.

#### $\mathbf{C}$

- 228. Campion, D. G. 1965. The present status of research on chemosterilants. Pest Artic. News Summ. 11: 467-491.
- 229. ——. 1967. Chemosterilization of the red bollworm (Diparopsis castanea Hmps.) by mutagenic agents. Nature (Lond.) 214: 1031-1032.
- 1967. The sterilisation of Lepidopterous pests by radiation and chemosterilants. Pest Artic. News Summ. Sect. A 13: 392-405.
- 231. ——. 1968. The chemosterilization of the red bollworm
   Diparopsis castanea Hmps. Lepidoptera: Noctuidae.
   [Abstr.] 13th Int. Congr. Entomol., Moscow, 1968,
   p. 45.
- 232. ———. 1969. Factors affecting the use of a chemosterilising bart-station for control of the red bollworm Diparopsis castanea (Hmps.), Pest Artic. News Summ. 15; 535-541.
- 283. ——. 1970. Chemosterilization of the red boll (Diparopsis castanea): a survey of fifteen com

- applied to adult moths Cotton Grow. Rev. 47: 135-140.
- 234 . 1971. Chemosterilisation of the red bollworm Diparopsis castanea Hmps. (Lep., Noctuidae): Effects of certain s-triazines and a carbamate insecticide. Bull. Entomol Res. 61: 351–356
- 235. ——. 1971. Chemosterilisation. Pest Artic. News Summ. 17: 308–312.
- 1972 Insect chemosterilants, A review. Bull. Entomol. Res. 61: 577-635.
- 237. ——. 1973. Effects of tepa and other aziridine alkylating agents on egg development in the red bollworm Diparopsis castanea and the silver Y moth Autograph gamma (Lepidoptera, Noctuidae). Bull. Entomol. Res. 62: 401–405.
- 238 ———, and Outram, I. 1967. Factors affecting male probing activity of the red bollworm *Diparopsis castanea* (Hmps) in relation to sterility induced by tris(1-azırıdınyl) phosphine oxide (tepa). Ann. Appl. Biol. 60; 191–198.
- 239. ——, and Outram, I. 1968. Insecticidal and possible chemosterilant effects of certain organo-metal compounds against red bollworm. Int. Pest Control 10: 21-24.
- 240. ——, and Lewis, C. T. 1971. Studies of competitiveness, chemosterilant persistence and sperm structure in treated red bollworm *Diparopsis castanea* (Hmps.). In Symp. Steril. Princ. Insect Control Erad. IAEA Proc. Ser. STI/PUB/265, pp. 183-202
- 241. ——, and Critchley, B. R. 1972. Interference with growth and reproduction as a means of controlling insect pests of cotton. Cotton Grow. Rev. 49: 179-186.
- 242. Cannon, W. N., Jr., and Terriere, L. C. 1970. Daily egg production of *Tetranychus urticae* on metal chelatetreated leaves. J. Econ. Entomol. 63: 421-422.
- 243. Cantwell, G. E., and Henneberry, T. J. 1963. The effects of gamma radiation and apholate on the reproductive tissues of *Drosophila melanogaster* Meigen, J. Insect Pathol. 5: 251–264.
- 244. Carcavallo, R. U., and Carabajal, C. A. 1971. Efectos del tepa en tres especies de Triatominae. In Symp. Steril. Prmc. Insect Control Erad. Proc. IAEA Proc. Ser. STI/PUB/265, pp. 247–252.
- 245. Carlisle, D. B., Ellis, P. E., and McVeigh, L. J. 1968. (2-Chloroethyl)-trimethylammonium ehloride inhibits gametogenesis in locusts. Nature (Lond.) 220: 189-190.
- 246. Carrillo, J. L., Ortega, A., and Rodriguez, Y. J. 1963-64. Effecto esterilizante de las radiaciones gamma y del compuesto apholate sobre la conchuela del frijol. Agric. Tec. Mex. 2(4): 1-8.
- Cassidy, J. D., and Grosch, D. S. 1973. Quantitative effects of purine analogue ingestion on reproduction of Habrobracon juglandis. J. Econ. Entomol. 66: 319-324.
- 248. Castle, R. E., and Ristich, S. S. 1965. Structure-activity relationships in apholate analogs. 150th Meet. Amer. Chem. Soc., Sept. 12–17. Abstracts of papers, p. 22A.
- 249. Cattanach, B. M., and Edwards, R. G. 1958. The effects of triethylenemelamine on the fertility of male mice. Proc. Roy. Soc. Edinb. Sect. B 67: 54-64.
- Cenedella, R. J., and Crouthamel, W. G. 1974. Effect of aspirn upon male mouse fertility. Prostaglandins 4: 285-290.

- Chabra, K. S. 1971. Sterilizing effect of fusariotoxin on Tetranychus tetarius. Mikrobiol. Zh. (Kiev) 33: 353–355. [In Ukrainian.]
- Chadwick, P. R. 1964. Effect of two chemosterilants on Glossina morsitans. Nature (Lond.) 204, 299-300.
- Chamberlain, W. F. 1962. Chemical sterilization of the screwworm, J. Econ. Entomol. 55: 240–248.
- 254. ——, and Barrett, C. C. 1964. A comparison of the amounts of metepa required to sterilize the screwworm fly and the stable fly. J. Econ. Entomol. 57: 267-269.
- and Barrett, C. C. 1968. Incorporation of tritiated thymidine into the ovarian DNA of stable flies: Effects of treatment with apholate. Nature (Lond.) 218: 471-472.
- and Hamilton, E. W. 1964. Absorption, excretion, and metabolism of P<sup>32</sup>-labeled metapa by screwworm and stable flies. J. Econ. Entomol. 57: 800–803.
- 257. ——, and Hopkins, D. E. 1960. Effect of colchicine on screwworms, J. Econ. Entomol. 53; 1133-1134.
- 258. Chandley, A. C., and Bateman, A. J. 1962. Timing of spermatogenesis in *Drosophila melanogaster* using tritiated thymidine. Nature (Lond.) 193: 299-300.
- 259. Chang, J. T., and Chiang, Y. C. 1963. Studies on insect chemosterilants, II. Thio-topa as a chemosterilant for armyworm moth (*Pseudaletia separata*). Acta Entomol, Sin. 12, 538-542.
- 260. ——, and Chiang, Y. C. 1964. Studies on insect chemosterilants. III. The sterilizing effect of thio-tepa on the common housefly, Musca domestica vicina Macq. Acta Entomol. Sin. 13: 679-688.
- Tsao, T. P., and Chiang, Y. C. 1963. Studies on insect chemosterilants. I. Screen tests of 35 chemicals as insect chemosterilants. Acta Entomol. Sin. 12: 394-401.
- Chang, S. C. 1965. Chemosterilization and mating behavior of male houseflies. J. Econ. Entomol. 58: 669-672.
- 1965. Improved bioassay method for evaluating the potency of chemosterilants against houseflies. J. Econ. Entomol. 58: 796.
- 264. ——, and Borkovec, A. B. 1964. Quantitative effects of tepa, metepa, and apholate on sterilization of male houseflies. J. Econ. Entomol. 57: 488–490.
- and Borkovec, A. B. 1966. Determination of tepa residues on chemosterilized Mexican fruit flies. J. Econ. Entomol. 59: 102-104.
- and Borkovec, A. B. 1966. Structure-activity relationship in analogs of tepa and hempa. J. Econ. Entomol. 59: 1359-1362.
- and Borkovec, A. B. 1969. Comparative metabolism of <sup>14</sup>C-labeled hempa by houseflies susceptible or resistant to isolan. J. Econ. Entomol. 62: 1417–1421.
- 268. ——, Borkovec, A. B., and Woods, C. W. 1966. Fate of tepa uniformly labeled with C<sup>14</sup> in male houseflies. J. Econ. Entomol. 59: 937-944.
- 269. ——, Borkovec, A. B., and Woods, C. W. 1970. Metabolism of <sup>14</sup>C-labeled N<sup>2</sup>',N<sup>2</sup>',N<sup>4</sup>',N<sup>4</sup>'-tetramethylmelamine in male houseflies. J. Econ. Entomol. 63: 1510-1513.
- Borkovec, A. B., and Woods, C. W. 1970. Sterilizing activity of bis(1-aziridinyl) phosphine oxides and sulfides in male houseflies. J. Econ. Entomol. 63:

- 1744-1746.
- Borkovec, A. B., Woods, C. W, and Braun, B. H.
   1974. Sterilization of male houseflies by fumigation with azırıdinylphosphine oxides and sulfides. J Econ. Entomol. 67: 1–2
- Borkovec, A. B., Woods, C. W., and Terry, P. H.
   Chemosterilization of male houseflies by fumigation J. Econ. Entomol. 66: 23–26.
- 273. , DeMilo, A. B., Woods, C. W., and Borkovec, A. B. 1968. Metabolism of C<sup>14</sup>-labeled hemel in male houseflies. J. Econ. Entomol. 61<sup>1</sup> 1357–1365.
- 274. ——, and Oliver, J E. 1972. Formation of an active male chemosterilant from degradation of 1,1,5,5-tetramethyl-2,4-dithiobiuret. J. Econ Entomol. 65: 1751.
- Oliver, J. E., Brown, R. T., and Borkovec, A. B. 1972. Chemosterilization of male houseflies with dithiazolium compounds and with tetramethyldithiobiuret J. Econ. Entomol. 65: 390-392.
- Terry, P. H., and Borkovec, A. B. 1964. Insect chemosterilants with low toxicity for mammals. Science 44: 57-58.
- Terry, P. H., Woods, C. W., and Borkovec, A. B.
   1967. Metabolism of hempa uniformly labeled with C<sup>14</sup> in male houseflies. J. Econ. Entomol. 60: 1623–1631.
- 278. Chaudhary, K. D., Bernard, R., and Lemonde, A. 1966. Effect of furadroxyl on *Tribolium confusum* Duval, Can. J. Zool. 44; 144-146.
- 279. Chaudhuri, N. K., Montag, B. J., and Heidelberger, C. 1958. Studies on fluorinated pyrimidines. III. The metabolism of 5-fluorouracil-2-C<sup>14</sup> and 5-fluoroorotic-2-C<sup>14</sup> acid in vivo. Cancer Res. 18: 318-328.
- Chaudhury, H. S. 1971. Sterility and population control in insects and other animals, Proc. 61st Sess. Indian Sci. Congr., Part II, pp. 28-46.
- 281. Chawla, S. S., Taylor, K. B., and Berryman, A. A. 1970. Sterile male technique for control of the European pine shoot moth, *Rhyacionia buoliana*. Wash. Agric. Exp. Stn. Tech. Bull. No. 64, 6 pp.
- 282. Perron, J. M., and Huot, L. 1973. Potato aphid. Effects of five chemosterilants. J. Econ. Entomol. 66: 963-965.
- 283. Chikaki, H. 1967. Field experiments on the control of houseflies with chemosterilants. Shimane Noka Diagaku Kenkyu 15(A-1); 62-68.
- 284. Chow, Fu-Ho C., Hanson, K. J., Hamar, D. W., and Udall, R. H. 1972. Reproductive failure of mice caused by pine needle ingestion. J. Reprod. Fertil. 30: 169-172.
- Christenson, L. D. 1966. Application of sterilization techniques for controlling and eradicating insect pests.
   U.S. Dep. Agric., Agric. Res. Serv. [Rep.] No. ARS-38-110, pp. 95-102.
- Clark, A. M. 1959. Mutagenic activity of the alkaloid heliotrine in *Drosophila*. Nature (Lond.) 163: 731.
- 1960. The mutagenic activity of some pyrrolizidine alkaloids in *Drosophila*, Z. Vererblehre 91: 74-80.
- 288. ——, and Clark, É. G. 1968. The genetic effects of caffeine in *Drosophila melanogaster*. Mutat. Res. 6: 227-234.
- 289. Cline, R. E. 1968. Evaluation of chemosterilant damage to the testes of the housefly, *Musca domestica*, by microscopic observation and by measurement of the up-

- take of 14C-compounds J. Insect Physiol, 14: 945-953.
- 290. Coaker, T. H., and Smith, J. L. 1970. Sterilisation of the cabbage root fly (Erroischia brassicae (Bch.)) (Dipt., Anthomyildae) with tepa Laboratory and field cage tests Bull, Entomol. Res. 60: 53-60.
- Cohen, E., and Levinson, H. Z. 1968. Disrupted fertility
  of the hidebeetle *Dermestes maculatus* (Deg.) due to
  dietary overdosage of biotin. Experientia 24: 367–368.
- 292. , and Levinson, H. Z. 1972. Chemosterilizing effect of biotin on the hidebeetle *Dermestes maculatus* (Dermestidae: Coleoptera). Comp. Biochem. Physiol. B 43: 143-149.
- 293. ——, and Levinson, H. Z. 1972. Effect of fatty acids on reproduction of the hidebeetle *Dermestes maculatus* (Dermestidae. Coleoptera). Life Sci. 11(Part 2): 293-299.
- 294. Cohen, S. S., Flaks, J. C., Barner, H. D., Loeb, M. R., and Lichenstein, J. 1958. Mode of action of 5-fluorouracil and its derivatives. Proc. Nat. Acad. Sci. U.S.A, 44: 1004-1012.
- 295. Collier, C. W., and Downey, J. E. 1965. Laboratory evaluation of certain chemosterilants against the gypsy moth. J. Econ. Entomol. 58: 649-651.
- 296. , and Downey, J. E. 1967. Laboratory and field evaluation of chemosterilants for the gypsy moth in 1964, 1965. J. Econ. Entomol. 60: 265-268.
- and Tardif, R. 1967. Analysis of male gypsy moths for microgram quantities of tepa. J. Econ. Entomol. 60: 28-30.
- 298. Collins, T. F. X., Hansen, W. H., and Keeler, H. V. 1971. The effect of carbaryl (sevin) on reproduction of the rat and the gerbil, Toxicol. Appl. Pharmacol. 19: 202–216.
- 299. Combiesco, I., and Enesco, A. 1967. Etude de l'action des chemosterilisants—Thiotepa et apholate sur le developpement des ovaires de l'espece Musca domestica L. Note II. Arch. Roum. Pathol. Exp. Microbiol. 26: 215-228.
- 300. ——, Duport, M., and Enesco, A. 1967. Sterilisation de l'espece Musca domestica L. par traitement avec divers produits chimiques. Note I. Recherches de laboratoire. Arch. Roum. Pathol. Exp. Microbiol. 26: 205–215.
- Duport, M. and Enesco, A. 1969. Etudes dur la sterilisation de l'espece Musca domestica L. avec divers chimiosterilisants. 3ème Congrès Internazional des Antiparasitaires, Milan (Oct. 6-8, 1969) pp. 227-234.
- 302. \_\_\_\_\_, and Enesco, A. 1968. Sterilization with thiotepa of the species Musca domestica in the pupal stage. Arch. Roum. Pathol. Exp. Microbiol. 27: 715.
- Conney, A. H., and Burns, J. J. 1972. Metabolic interactions among environmental chemicals and drugs. Science 178; 576-586.
- 304. Corwin, H. O. 1968. The mutagenic effect of N-nitrosomethylurea on the Dumpy locus in Drosophila melanogaster. Mutat. Res. 5: 259-270.
- 305. Coulon, J., and Daftari, A. 1969. Etude de l'action sterilisante du 4 chlorophenyl, 2,4,5 trichlorophenyl azosulfure applique aux femelles de Tetranychus urticae. Importance de cette action selon le stade traite. Sème Congrès Internazional des Antiparasitaires, Milan, 1969, pp. 215-225.
- Cox, H C, Young, J. R., and Bowman, M. C. 1967. Persistence of tepa in fall armyworm moths. J. Econ. En-

- tomol, 60 1111-1115
- 307 Craig, A. W., Fox, B. W., and Jackson, H. 1958 Sensitivity of the spermatogenic process in the rat to radiomimetic drugs and x-rays. Nature (Lond.) 181: 353-354.
- 308. ———, Fox, B. W., and Jackson, H. 1959. Metabolic studies of <sup>32</sup>P-labeled triethylenethiophosphoramide. Biochem Pharmacol 3: 42.
- 309. Craig, G. B., Ji. 1966. Sterilization of female mosquitoes with male accessory gland substance. [Abstr.] Bull. Entomol. Soc. Amer. 12: 225
- 310. ———, and Fuchs, M. S. 1969 Sterilization of female mosquitoes with a hormone derived from male mosquitoes, Patent 3,450,816. U.S. Pat. Off. Gaz 863: 902.
- 311 Cram, W T 1967. Reversible sterility in the parthenogenetic black vine weevil when fed untreated foliage interposed with apholate-treated foliage. J. Econ Entomol 60, 885-886.
- 312. Creighton, C. S., Cuthbert, E. R., Jr., and Reid, W. J., Jr. 1966. Fecundity of and hatch of eggs from banded cucumber beetles treated with three aziridines; Preliminary tests. J. Econ. Entomol. 59, 163-165.
- Cressman, A. W. 1963. Response of citrus red mite to chemical sterilants. J. Econ. Entomol. 56: 111-112.
- 314. Critchley, B. R., and Campion, D. G. 1971. Effects of a juvenile hormone analogue on growth and reproduction in the cotton stainer *Dysdercus fasciatus* Say Bull. Entomol. Res. 61: 49-53.
- 315. ——, and Almeida, A. A. 1973. Side effects of solvents, especially acetone, used for the application of juvenile hormone mimics and chemosterilants. Bull. Entomol. Res. 63, 1–6
- Crystal, M. M. 1963. The induction of sexual sterility in the screwworm fly by antimetabolites and alkylating agents. J. Econ. Entomol. 56: 468-473.
- 318. ———— 1964. Chemosterilant efficiency of bis (1-arizidinyl) phosphinyl carbamates in screwworm flies. J. Econ. Entomol. 57: 726-731.
- 1964. Insect fertility: Inhibition by folic acid derivatives. Science 144: 308–309.
- 321. ——. 1965 First efficient chemosterilants against screwworm flies (Diptera Calliphoridae). J. Med. Entomol. 2: 317–319.
- 322. ———. 1965. Sexual sterilization of insects by aerosol administration of alkylating agents. J. Econ. Entomol. 58: 678-680
- 323. ———— 1966. Some structure-activity relationships among aziridinyl antifertility agents in screwworm flies. J. Econ. Entomol. 59: 577-580.
- 324. . . 1966. Sexual sterilization of screwworm flies by a peroral chemosterilant: Quantitative aspects and relation to pretreatment starvation. J. Econ. Entomol. 59: 580–585.
- 325. ———, 1967. Chemosterilant effect of tretamine enhanced in screwworm flies exposed to extraoptimal temperatures. J. Econ. Entomol. 60: 880-881.

- screwworm flies J Econ Entomol. 60: 1005-1007.
- 327. ——. 1968. Chemosterilization of screwworm flies, Cochliomyta hominivorax (Coquerel) (Diptera: Calliphoridae) Influence of age at treatment and mating, effect on survival, and transfer of chemosterilant by contamination J. Med. Entomol. 5 439-445
- 328. ———. 1968 Sexual sterrlization of screwworm flies by N, N' tetramethylenebis (1 aziridinecarboxamide). Influence of route of administration, J. Econ. Entomol. 61: 134–139.
- 329. ——. 1968. Sexual sterilization of screwworm flies by orally administered 1-[bis(1-aziridinyl)phosphinyl]-3-(3,4-dichlorophenyl)urea: Effects of feeding times and concentrations of vehicle. J. Econ. Entomol 61: 140–142.
- 330 . 1968. Sulfonic acid esters as chemosterilants of screwworm flies with particular reference to methanediol dimethanesulfonate. J. Econ. Entomol. 61, 446–449.
- 331. ———. 1969. Changes in susceptibility of screwworm flies to the chemosterilant N,N'-tetramethylene-bis(1-aziridinecarboxamide), with time of administration. J. Econ. Entomol. 62. 275–276.
- 332. ——. 1969. Chemosterilant-induced increase in mating ability of male screwworm flies (Diptera: Calliphoridae). J. Med. Entomol. 6. 90-91.
- 333. ————. 1969. Sexual sterilization of screwworm flues.

  Reliability of the chemosterilant technique. J. Econ.
  Entomol, 62: 136–139.
- 334. ———. 1970. Dose response curves for dominant lethal mutations induced in the sperm and oocytes of screwworm flies by N,N'-tetramethylenebis(1-aziridinecarboxamide). Ann Entomol. Soc. Amer 63: 1369–1372
- 335. ——. 1970. Effects of delayed fertilization screwworm flies on induction of dominant lethal mutations by N,N'-tetramethylenebis(1-aziridinecarboxamide). Ann. Entomol. Soc. Amer. 63. 71-74.
- 336. ———. 1970. Vanadium compounds as inhibitors of reproduction of the screwworm fly. J. Econ. Entomol. 63; 321–323.
- 1970. Thiosemicarbazones, a new category of antifertility compounds for screwworm flies. J. Econ. Entomol. 63: 491-492.
- 338. ———. 1970. Antifertility effects of inorganic iodine in screwworm flies. J. Econ. Entomol. 63; 1851–1853.
- 339. ——. 1971. Sexual sterilization of screwworm flies by N,N'-tetramethylenebis(1-aziridinecarboxamide): Further studies on influence of route of administration, J. Med. Entomol. 8: 304–306.
- 840. ——. 1971. Sexual sterilization of screwworm flies: Further studies of reliability of the chemosterilant technique. J. Med. Entomol. 8: 549-551.
- 341. ——. 1971. Chemosterilization of screwworm flies with negligible residues for release in nature. J. Med. Entomol. 8; 696–699.
- 342. ——. 1972. Chemosterilization of male screwworm flies by immersion. Changes in susceptibility with time of treatment, permanence of sterility, and effect of treatment on survival. J. Med. Entomol. 9: 509–510.
- 348. ———. 1973. Chemosterilization of screwworm flies: Modification of action by temperature. Environ. Entomol. 2: 145–146.

- testes of the adult screwworm. J. Econ Entomol, 66 424-426.
- 345 , and LaChance, L E. 1963. The modification of reproduction in insects treated with alkylating agents I. Inhibition of ovarian growth and egg production and hatchability. Biol. Bull. 125: 270-279.
- 346. Cuellar, C. B. 1969. A theoretical model of the dynamics of an Anopheles gambiae population under challenge with eggs giving rise to sterile males. Bull. WHO 40: 205–212.

#### D

- 347. D'Alessandro, G., Bruno-Smiraglia, C., and Lavagnino, A. 1966. Saggi di chemosterilizzazione con tepa su Anonheles labranchiae. Riv. Malariol. 45: 40-49.
- 348. ——, Bruno-Smiraglia, C., and Lavagnino, A. 1969.

  Dimostrazione, attraverso l'impiego di maschi sterilizzati con tepa, che nelle femmine di Anopheles atroparvus il primo accoppiamento e l'unico valido ai fini della fecondazione. 3ème Congrès Internazional des Antiparasitaires, Milan (Oct. 6-8, 1969), pp. 235-241.
- 349. Dame, D. A., and Schmidt, C. H. 1964. Uptake of metepa and its effect on two species of mosquitoes (*Anopheles quadrimaculatus*, *Aedes aegypti*) and houseflies (*Musca domestica*). J. Econ. Entomol. 57: 77-81.
- 350. ——, Dean, G. J. W., and Ford, J. 1964. Investigations of the sterile male technique with Glossina morsitans. Dixieme Reunion, Int. Sci. Comm. Trypanosomiasis Res., Kampala, Uganda (Nov. 24–28, 1964), pp. 93–96.
- and Ford, H. R. 1964. Chemosterilization and its permanency in mosquitoes. Nature (Lond.) 201: 733-734.
- 352. ——, and Ford, H. R. 1966. Effect of the chemosterilant tepa on Glossina morsitans Westw. Bull. Entomol. Res. 56(Part 4): 649-658.
- 358. ——, and Ford, H. R. 1968. Multiple mating of Glossina morsitans Westw. and its potential effect on the sterile male technique. Bull. Entomol. Res. 58: 213-219.
- 854. ——, Lofgren, C. S., Ford, H. R., Boston, M. D., Baldwin, K. F., and Jeffery, G. 1974. Release of chemosterilized males for the control of Anopheles albimanus in El Salvador. II. Methods of rearing, sterilizing, and distribution. Amer. J. Trop. Med. Hyg. 28: 282-287.
- and Mackenzie, P. K. I. 1968. Transmission of Trypanosoma congolense by chemosterilized male Glossina morsitans. Ann. Trop. Med. Parasitol. 62: 372–374.
- and Schmidt, C. H. 1970. The sterile-male technique against tsetse flies, Glossina spp. Bull. Entomol. Soc. Amer. 16: 24-30.
- 357. ——, Woodard, D. B., and Ford, H. R. 1964. Chemosterilization of *Aedes aegypti* (L.) by larval treatments. Mosq. News 24: 1-6.
- 358. ——, Woodard, D. B., Ford, H. R., and Weidhaas, D. E. 1964. Field behavior of sexually sterile Anopheles quadrimaculatus males. Mosq. News 24: 6-14.
- 359. Danezis, J. 1968. Antifertility agents and mammalian gonads. A proposal for assessing the effectiveness of antifertility compounds. Int. Fert. 13: 95-102.
- 360. Das, M. 1967. Sterilization of Culex pipiens fatigans

- Wiedemann by apholate Bull. WHO 36: 949-954
- 361. Davich, T. B., Keller, J. C., Mitchell, E. B., Huddleston, P., Hill, R., Lindquist, D. A., McKibben, G., and Cross, W. H. 1965. Preliminary field experiments with sterile males for eradication of the boll weevil J. Econ. Entomol. 58: 127-131.
- 362. ——, Merkl, M. E., Mitchell, E. B., Hardee, D. D., Gast, R. T., McKibben, G. H., and Huddleston, P. A. 1967. Field experiments with sterile males for eradication of the boll weevil. J. Econ. Entomol. 60: 1533-1538.
- 363 David, J. 1964 Influence d'un inhibiteur de l'acide folique sur l'ovogénèse de la drosophile I. Etude de la fécondité du pourcentage d'éclosion de la taille des ocufs. J. Insect Physiol. 10, 805-817
- 364. Davidson, G. 1969. The potential use of sterile hybrid males for the eradication of member species of the Anopheles gambiae complex, Bull. WHO 40: 221–228.
- Davies, P., and Jackson, H. 1970. Experimental studies on the chemosterilization of Schistosoma mansoni. J. Parasitol. 61(Part 2): 167–176.
- Davis, D. E. 1962. Gross effects of truethylenemelamine on gonads of starlings Anat. Rec. 142: 353.
- 367. ———. 1966. Summary of major points from discussion of item 8. Seminar on rodents and rodent ectoparasites. Geneva (Oct. 24–28, 1966). WHO/Vector Control/ 66.217/: 221–222.
- Davis, H. G., and Eddy, G. W. 1966. Some effects of chemosterilants of the little housefly. J. Econ. Entomol. 59: 993-996.
- 369. de Lazlo, H., and Henshaw, P. S. 1954. Plant materials used by primitive peoples to affect fertility. Science 119: 626-631.
- DeMilo, A. B. 1970. Synthesis of diamino-s-triazinyl ketones. J. Heterocycl. Chem. 7: 987-990.
- 371. ——, and Borkovec, A. B. 1965. Analogs of hemel as chemosterilants. 150th Meet. Amer. Chem Soc., Sept. 12-17. Abstracts of papers, p. 22A.
- and Borkovec, A. B. 1968. Insect chemosterilants.
   VII. Oxidation of hexamethylphosphoric triamide and the synthesis of N-formyl-phosphoramides. J. Med. Chem. 11: 961.
- Borkovec, A. B., and Fye, R. L. 1974. Insect chemosterilants. Sulfonamides. J. Agric. Food Chem. 22: 197–199.
- 374. ———, Borkovec, A. B., and McHaffey, D. G. 1972.

  Chemosterilants against the boll weevil. 2.
  s-Triazines. J. Econ. Entomol. 65: 1548-1550.
- 375. ——, and Crystal, M. M. 1972. Chemosterilants against screwworm flies. 3. J. Econ, Entomol. 65; 594–595.
- Fye, R. L., and Borkovec, A. B. 1973. Insect chemosterilants. 14. Miscellaneous compounds effective in the housefly. J. Econ. Entomol. 66: 1007-1008.
- 877. ——, Oliver, J. E., and Gilardi, R. 1973. The synthesis and Dimroth-type rearrangement of 5,7-bis(dimethylamino) 3 (methylthio) s triazolo(4,3 a) s-triazines. J. Heterocycl. Chem. 10: 231-233.
- 378. Demkiv, L. P. 1973. Reaction of reproductive-system organs of male guinea pigs to choronic gonadotropin during the administration of dichlorodiphenyl-dichloroethane (o,p-DDD). Fiziol. Biokhim. Patol. Endokr. Sist 8; 12-15. [In Russian.]
- 379. De Wilde, Jan. 1964. Reproduction. In Morris Rocks\* (ed.), The Physiology of Insects, pp. 10-53. Acr

- Press. New York.
- 380 Dmoszynska, E., and Malicki, J. 1970. Chemosterilants Postepy Nauk Roln. 17, 97-103
- 381 Dodgen C. L., and Sullivan, S. 1969. Hematological effects of apholate on channel catfish (Ictalianus punctatus). Proc. Soc., Exp. Biol. Med. 131: 124-126.
- 382 Donnelly, J. 1965. Possible causes of failure in a field test of the "sterile males" method of control. Proc. 12th Int. Congr. Entomol., London (July 8-16, 1964), pp. 253-254.
- 383. Dorfman, R. I. 1972. Pest control compositions containing 1,2,3,4,9,10-hexahydrophenanthrene compounds. U.S. Pat. 3,658,961
- Dorsey, C. K. 1967. Experimental use of apholate to control face flies in pastures and houseflies in barns. W. Va. Univ. Bull. 555T, 16 pp.
- 385. Downey, J E. 1968. Effects of the chemosterilant hempa on gypsy moth metamorphosis. J. Econ. Entomol. 61: 846.
- 386. Drake, G. L., Jr., Kopacz, B. M., and Perkerson, F. S. 1958. Physiological and biological properties of APO and APS, cotton flame retardants, a literature review, with bibliography. U.S. Dep. Agric., Agric. Res. Serv [Rep.] No. ARS-14, 12 pp.
- Dunn, G. L., Actor, P., and DiPasquo, V J 1966, Antiparasitic agents I 2-(nitro-heterocyclic) benzimidazoles, benzonazoles, and benzothiazoles. J. Med. Chem. 9, 751-753.
- 388. Duport, M., Combiesco, I., and Enesco, A 1968 Traitement experimental de l'espece Musca domestica par du thiotepa, sur le terrain. Arch. Roum. Pathol. Exp. Microbiol. 27: 707
- 389. Dustin, P., Jr. 1963. New aspects of the pharmacology of antimitotic agents. Pharm. Rev. 15: 449–480.
- Duvall, L. R. 1960. Tris(1-azridmyl)phosphine oxide (tepa) Agent data summary. Cancer Chemother. Rep. 8, 156.

#### $\mathbf{E}$

- 391. Earle, N. W., Padovani, I., Thompson, M. J., and Robbins, W. E. 1970. Inhibition of larval development and egg production in the bollweevil following ingestion of ecdysone analogues. J. Econ. Entomol. 63: 1064–1069.
- 392. East, J. 1955. The effect of certain plant preparations on the fertility of laboratory mammals. 1. Polygonium hydropiper L. J. Endocrin 12: 252-260
- 393. \_\_\_\_\_\_, 1955. The effect of certain plant preparations on the fertility of laboratory mammals, 2. Psoralea corylifoha L. J Endocrin, 12: 261-266.
- 1955. The effect of certain plant preparations on the fertility of laboratory mammals 3. Capsella bursa pastoria L. J. Endocrin, 12: 267-272.
- Economopoulos, A. P. 1970. Mating activity and mortality in normal and chemosterilized *Oncopellus fuscialus* males. J. Econ. Entomol. 63: 1695–1696.
- 396. ——. 1971. Effects of tretamine on 4th- and 5th-instar Oncopellus fasciatus nymphs. Development of eggs from tretamine-treated females. In Symp. Steril. Princ. Insect Control Erad. Proc. IAEA Proc. Ser. STI/PUB/265, pp. 259-270.
- and Gordon, H. T. 1969. Action of certain chemosterilants on males of the large milkweed bug. J. Econ. Entomol. 62: 1326–1330.

- 398. ———, and Gordon, H. T. 1971. Chemosterdization of Oncopellus fasciatus. 1. Control experiments. J. Econ. Entomol. 64, 1351-1354
- 399 ——, and Gordon, H. T. 1971. Chemosterilization of Oncopellus fascuatus. 2. Effect of tretamine and metepa on adult males and females. J. Econ. Entomol. 64, 1355–1360.
- 400. ——, and Gordon, H. T. 1971. Chemosterilization of Oncopellus fascuatus. 3. Competition between normal and tretamme-sterilized insects. J. Econ. Entomol. 64, 1360–1364.
- 401 ——, and Gordon, H. T. 1971. Growth and differentiation of the testes in the large milkweed bug Oncopettus tascutus (Dallas). J. Exp. Zool. 177: 391–405
- 402. ——, and Gordon, H 'T 1972 Sperm replacement and depletion in the spermatheca of the S and CS strains of Oncopeltus fasciatus. Entomol Exp Appl 15: 1-12.
- 403 Eddy, G. W., Roth, A. R., and Abrahamsen, L. R. 1965. Sterilant effect of some materials on Acdes acquipti (L.) feeding on treated mice Mosq. News 25, 169-171.
- 404. Edwards, L. J. 1966. Growth inhibition of the house cricket with ethylene. J Econ. Entomol 59. 1541~1542
- 405 Eisler, R. 1966. Effects of apholate, an insect sterilant, on an estuarine fish, shrimp, and gastropod Prog. Fish Cult. 28: 154-158.
- 406. Elbadry, E. A., Abo Elghar, M. R., and Radwan, H. S. 1972. Chemosterilant effects of du-ter on adults of the Egyptian cotton leafworm, Spodoptera littoralis (Boisd.), Z. Angew. Entomol, 71 140-144.
- El-Dakroury, M. S. I., and MacCuaig, R. D. 1968. Fecundity and hatch of eggs from locusts treated with apholate and tepa. Bull Soc. Entomol. Egypte 52, 457-466.
- Elder, W. E. 1964. Chemical inhibitors of ovulation in the pigeon. J. Wildl. Manage. 28: 556.
- 409. El Ghar, M. R. Abo, Zakı, M. M., Mitri, S. H., and Kamel, A. A. M. 1971. The effect of four chemosterilants on the moths of the cotton leafworm. Bull. Entomol. Soc. Egypt Econ. Ser. 4: 23-34.
- 410. El-Ibrashy, M. T. 1971. Polyamines as selective chemosterilants for the male cotton leafworm. Naturwissenschaften 58: 148–149.
- 411. ———. 1971 Herbicide Eptan 6-E Selective female chemosterilant for the Egyptian cotton leafworm Spodoptera littoralis. Experientia 27: 808-809.
- 412. ——. 1972. The sterilant activity of certain biologically active compounds against *Spodoptera luttoralis* Bois. (Lepid., Noctudae), Z. Angew. Entomol. 71, 326–332.
- 413. ——, Aboul-Nasr, A. E., and Shehata, N. F. 1971. Induction of sexual sterility in the Egyptian cotton leafworm, *Spodoptera littoralis* Boisdayal, by feeding of certain compounds to adults (Lepidoptera, Noctudae) Appl. Entomol. Zool. 6; 213–214.
- 414. ——, and Abou-Zeid, E. N. 1972, Field evaluation of the sterilant activity of the herbicide EPTC (S-ethyldipropylthiolcarbamate) against the Egyptian cotton leafworm, Spodoptera littoralis. Appl. Entomol. Zool. 7: 168-170.
- 415. ———, and Boctor, I. Z. 1970. Biochemical effects of certain biologically active compounds on the cotton leafworm, *Spodoptera littoralis*, in relation to female maturation. Zool. Jahrb. Abt. Allg. Zool. Physiol. Tiere 75; 370-374.
- 416. Enesco, A., and Combiesco, I. 1970. Effect of thiotepa

- and apholate diets on the longevity of adults of *Musca domestica*. Arch Roum Pathol, Exp Microbiol, 29 230-248
- 417. Epstein, S. S., and Bishop, Y 1969. Mutageme effects of tepa and metepa in mice Genetics 61(2, Part 2, Suppl.): S16.
- 418. ——, Arnold, E., Steinberg, K., Mackintosh, D., Shafner, H., and Bishop, Y. 1970. Mutagenic and antifertility effects of tepa and metepa in mice. Toxicol. Appl. Pharmacol. 17: 23-40.
- 419 , Bass, W., Arnold, E., Bishop, Y., Joshi, S., and Adler, I. D. 1971. Sterility and semisterility in male progeny of male mice treated with the chemical mutagen tepa. Toxicol. Appl. Pharmacol. 19, 134-146.
- Ericsson, R. J., Downing, H. E., Marsh, R. E., and Howard, W. E. 1971. Bait acceptance by rats of microencapsulated male sterilant alphachlorohydrin. J. Wildl. Manage. 35: 573-576.
- Eriksson, H. 1965. Effects of oral administration of tepa in the male domestica [sic] rabbit. Arkiv. Zool. 16: 543-544.
- Ezueh, M. I., and Hoopingarner, R. A. 1967. Apholate chemosterilization of the cereal leaf beetle. J Econ. Entomol. 60: 907-910.

#### F

- Fabian, G. 1947. Effects of colchicine injected in female Drosophila. Arch. Biol. Hung. Ser. 2 17: 157.
- 424. Fahmy, O. G., and Bird, M. J. 1953. Chromosome breaks among recessive lethals induced by chemical metagens in *Drosophila melanogaster*. Heredity 6(Suppl.): 149-159.
- 425. ——, and Fahmy, M. J. 1954. Cytogenetic analysis of the action of carcinogens and tumour inhibitors in *Drosophila melanogaster* II. The mechanism of induction of dominant lethals by 2,4,6-tri-(ethylene-imino)-1,3,5-triazine, J. Genet, 52: 603.
- 426. ——, and Fahmy, M. J. 1955. Cytogenetic analysis of the action of carcinogens and tumour inhibitors in Drosophila melanogaster. III. Chromosome structural changes induced by 2,4,6-tri(ethylene-imino)-1,3,5-triazine. J. Genet. 53: 181-199.
- 427. ——, and Fahmy, M. J. 1955. Cytogenetic analysis of the action of carcinogens and tumour inhibitors in *Drosophila melanogaster*. IV. The cell stage during spermatogenesis and the induction of intra- and intergenic mutations by 2,4,6-tri-(ethylene-imino)-1,3,5-triazine. J. Genet. 53: 563-584.
- 428. ——, and Fahmy, M. J. 1956. Cytogenetic analysis of the action of carcinogens and tumour inhibitors in *Drosophila melanogaster*. V. Differential genetic response to the alkylating mutagens and X-radiation, J. Genet. 54: 146–164.
- 429. ——, and Fahmy, M. J. 1958. Discussion of paper, "Mutagenic effects of alkylating agents [by C. Auerbach]." Ann. N.Y. Acad. Sci. 68: 736-748.
- 430. ——, and Fahmy, M. J. 1960. Cytogenetic analysis of the action of carcinogens and tumour inhibitors in Drosophila melanogaster. VI. The mutagenic cell-stage response of the male germ line to the nitrogen mustard derivatives of amino acids, carboxylic acids and amines. Genet. Res. 1: 173.
- 431. ——, and Fahmy, M. J. 1961. Cytogenetic analysis of

- the action of carcinogens and tumour inhibitors in *Drosophila melanogaster* IX. The cell stage response of the male germ line to the mesyloxy resins. Genetics 46: 361-372
- 432. ——, and Fahmy, M. J. 1961 Cytogenetic analysis of the action of carcinogens and tumour inhibitors in *Drosophila melanogaster*, X. The nature of the mutations induced by the mesyloxy esters in relation to cross-linkage. Genetics 46, 447–458
- 433. ——, and Fahmy, M. J. 1961. Cytogenetic analysis of the action of carcinogens and tumour inhibitors in *Drosophila melanogaster* XI. Mutagenic efficiency of the mesyloxy esters on the sperm in relation to molecular structure. Genetics 46: 1111.
- and Fahmy, M. J. 1964. The chemistry and genetics of alkylating chemosterilants. Trans. Roy. Soc. Trop. Med. Hyg. 58; 318–326.
- 435. ———, and Fahmy, M. J. 1964. A symposium on chemosterilants in pest and vector control. II The chemistry and genetics of the alkylating chemosterilants. Trans. Roy. Soc. Trop. Med. Hyg. 58; 318–326.
- ——, and Fahmy, M. J. 1968. Mutational mosaicism in relation to dose with the amme and amide derivatives of nitroso compounds in *Drosophila melanogaster*. Mutat. Res. 6: 139-154.
- 437. ——, and Fahmy, M. J. 1969. The genetic effects of the biological alkylating agents with reference to pesticides. Ann. N.Y. Acad. Sci. 160; 228-243.
- 438. ——, and Fahmy, M. J. 1970. Hydroxylamine and derivatives: Cytotoxicity without mutagenicity in cellular genetic systems Chem. Biol. Interactions 2: 331-348.
- 439. ——, Fahmy, M. J., Massasso, J., and Ondrej, M. 1966.

  Differential mutagemeity of the amine and amide derivatives of nitroso compounds in *Drosophila melanogaster*. Mutat. Res. 3: 201-217.
- Feldmesser, J., Beroza, M., and Rebois, R. V. 1962. Effects of chemosterilants on Saphrophytic nematodes.
   J. Parasitol. 48: 44.
- 441. Feliciangeli, M. D. 1970. Preliminary tests of adult *Rhodnius prolixus* sterilization by tarsal contact with metepa-treated surfaces. Riv. Parassitol. 31: 285–290. [In Italian.]
- 1972. Chemosterilization of adult Rhodnius prolivus by metepa, J. Med. Entomol, 9: 139-143.
- 1972. Laboratory test with the chemosterilant hempa in *Rhodnius prolivus*. Acta Cient. Venez. 23: 135-136.
- 444. \_\_\_\_\_\_. 1972. Sterilization of adult Rhodnius prolivus by tarsal contact on plastic surfaces treated with metepa and its residual effect. Riv. Parassitol. 33: 67-74.
- 445. Felix, R., and Rodriguez, R. 1971. Actinomycin D effects on the frequency of X-chromosome loss and nondisjunction in *Drosophila melanogaster* females. An. Inst. Biol. Univ. Nac. Auton. Mex. Ser. Biol. Exp. 39: 13-21.
- 446. Fels, E. 1973. Gonadal function of the rat after prenatal injection of estradiol benzoate. Endokrinologie 62: 10-16. [In German.]
- 447. Ferrer, F. R., Grosch, D. S., and Guthrie, F. E. 1968. Effect of chemical protectants on the action of apholate to the housefly. J. Econ. Entomol. 61: 719-724.
- Finch, S., and Skinner, G. 1973. Chemosterilization of the cabbage root fly under field conditions. Ann. Appl.

- Biol 73: 243-258.
- 449 Flint, H. M., Klassen, W., Kressin, E., and Norland, J. 1968. Chemosterilization of the tobacco budworm: A survey of 21 compounds applied topically. J. Econ. Entomol. 61: 938-941
- 450 Earle, N., Eaton, J., and Klassen, W. 1973.

  Chemosteribization of the female boll weevil. J. Econ.
  Entomol. 66, 47–53
- 451. ———, Klassen, W., Kressin, E., and Norland, J. 1968.

  Chemosterilization of the tobacco budworm: A survey of 16 compounds fed to adult moths. J. Econ. Entomol. 61, 1726–1729.
- 452. Fox, B. W., and Jackson, H 1965 In vivo effects of methylene dimethanesulphonate on proliferating cell systems, Brit. J. Pharmacol. Chemother. 24: 24
- 453. ———, Partington, M., and Jackson, H. 1963. Action of alkylating agents on sea urchin gametes. Exp. Cell Res. 29, 137-143.
- 454 Fried, M. 1971 Determination of sterile-insect competitiveness, J. Econ. Entomol. 64: 869-872.
- 455. Frishman, A. M. 1968. A comparison and evaluation of residual, oral, and topical treatments of tepa, tris (1-aziridinyl)phosphine oxide, used to sterilize German cockroaches Blattella germanica (Linnaeus). Diss. Abstr. Sect. B 29(3): 1051B.
- 456. Fritz, H., and Hess, R 1971 Effects of cyclophosphamide on embryonic development in the rabbit. Agents Actions 2: 83
- 457. Frohberg, H., Gleich, J., and Kieser, H. 1973. Reproduction-toxiocologic studies on ascorbic acid in mice and rats. Arzneim. Forsch. 23, 1081-1082. [In German.]
- 458. Fuchs, M. S., Craig, G. B., and Despommier, D. D. 1969. The protein nature of the substance inducing female monogamy in Acides acquait. J. Insect Physiol. 51, 701
- 459. Fujita, T., Tsuji, H., Deura, H., and Nakajima, M. 1969 Insect sterilization activity of the 1-methyl-1nitroso-3-phenylurea derivatives. Agric. Biol. Chem. 33 785-789.
- Fye, R. L. 1967. Screening of chemosterilants against houseflies. J. Econ. Entomol. 60: 605-607.
- Gouck, H. K., and LaBrecque, G. C. 1965. Compounds causing sterrity in adult houseflies. J. Econ. Entomol. 58: 446-448
- Gouck, H. K., and LaBrecque, G. C. 1966. Screening tests of chemicals for sterilization of adult houseflies. J. Econ. Entomol. 59: 485–487.
- 463. ——, and LaBi ecque, G. C. 1966. Sexual acceptability of laboratory strains of male houseflies in competition with wild strains. J. Econ. Entomol. 59: 538-540.
- 464. ——, and LaBrecque, G. C 1971. Chemicals as inhibitors of the reproduction of houseflies. J. Econ. Entomol. 64: 756-758.
- 465. ——, and LaBrecque, G. C. 1971. Autosterilization of houseflies with several chemosterilants. J. Econ. Entomol, 64: 978–974.
- 466. —, LaBrecque, G. C., Borkovec, A. B., and Morgan, J., Jr. 1969. Compounds affecting fertility of adult houseflies. J. Econ. Entomol. 62, 522-524.
- 467. ——, La Brecque, G. C., Morgan, P. B., and Bowman, M. C. 1968 Development of an autosterilization technique for the housefly. J. Econ. Entomol. 61: 1578-1581.
- 468. ----, Morgan, P. B., and LaBrecque, G. C. 1973.

- Evaluating repellency of chemosterilants to house-flies, J. Econ. Entomol, 66; 354–355.
- 469. ——, and Oliver, J. E. 1974. Chemosterilants for the housefly. J. Agric. Food Chem. 22, 374–376.
- 470 , Woods, C. W., Borkovec, A. B., and Terry, P. H. 1973. Chemosterilants for the housefly. Further screening tests. J. Econ. Entomol. 66: 38-44.
- 471. Fytizas, E 1967. Action du tepa sur les adultes de Dacus oleae Gmel. (Diptera: Tephritidae), en fonction des quantites du chimiosterilisant utilisées. Ann. Inst Phytopath. Benaki (Nouv. Ser.) 8: 32–46.
- 472. \_\_\_\_\_\_, 1967 Influence de quelques facteurs sur l'action sterilisante du tepa sur les femelles de *Ducus oleae* Gmel (Diptera: Tephritidae) Meded, Ryksfac, Landbouwwet, Gent 32, 717-725
- 473. ——, 1968. Action de l'actidione (cyclohevimide) sur les adultes de *Dacus oleae* Gmel (Diptera: Tephritidae).

  Ann Epiphyt 19: 261-265.
- 474. ——, 1969. Effets cytotoxques du tepa sur les males de *Dacus oleac* Meded Rijksfac. Landbouwwet. Gent. 34, 637-641.
- 475. ————. 1969. Inhibition du développement darvaire de la descendance de Dacus oleae (Gmel.) (Diptera: Tephritidae) par la Streptomycine incorporée à la nourriture d'adultes I. Doses de streptomycine efficaces pour l'inhibition. Z. Angew. Entomol. 62: 268–271.
- 476. ———. 1970. Action de quelques antibiotiques sur les adultes de *Dacus oleae* (Gmel.) et leur descendance. Z. Angew. Entomol 65: 458–458.
- 477. ———, 1970. Symptoms of tepa mtoxication in adults of Dacus oleae. Meded Fac. Landbouwwet. Rijksuniv. Gent. 35; 97–103.
- 478. ———. 1971 La chimiosterihsation des adultes de Dacus oleae (Gmelin) per le tepa. Differences entre les deux sexes, In Symp. Steril Princ. Insect Control Erad. Proc. IAEA Proc. Ser. STI/PUB/265, pp. 241-246.
- 479. ———. 1971. Competition of tepa-sterilized and normal Dacus olcae males. Ann. Inst. Phytopathol. Benaki 10: 210–216.
- 480 ———. 1972. Development of eggs laid by tepa-treated Dacus olcae females. Meded. Fac. Landbouwwet. Rijksuniv. Gent. 36: 945-949
- 481. ——, and Bacoyannis, A. 1968 Action of reserpine on Dacus oleae Gmel, (Fr.). Ann. Epiphyt. 19: 623-628.
- 482. ——, and Bacoyannis, A. 1968. Action du tepa sur le developpement nymphal de *Dacus olcae* Gmel. (Diptera: Tephritidae). *In* Isotopes and Radiation in Entomology. Proc. Symp. FAO/IAEA, Vienna (Dec. 4-8, 1967), pp. 209-215.
- 483. ——, and Bacoyannis, A. 1968. Action du tepa sur des femelles de *Dacus oleae* Gmel. suxuallement mures. Meded. Rijksfac. Landbouwwet. Gent. 33: 917-925.
- 484. ——, and Bacoyannis, A. 1969. Action sterilisante (temporaire et permanente) du tepa sur les males de *Dacus oleae*. Sème Congrès Internazional des Antiparasitaires, Oct. 6–8, 1969), 10 pp.
- 485. ———, and Mazomenos, B. 1971. Influence de la temperature et de la lumiere sur l'efficacite sterilisante du tepa sur les femelles de *Dacus oleac* Gmel, Ann, Zool. Ecol. Anim. 3: 209–215.
- 486. ——, and Tzanakakis, M. E. 1966. Some effects of streptomycin, when added to the adult food, on the adults of *Dacus oleae* and their progeny. Ann. Entomol. Soc. Amer. 59: 269-273.

- 487. Gadallah, A. I, and Stafford, E. M. 1971. Chemosterilant effects of metepa and tretamine on larvae, pupae, and adults of *Drosophila melanogaster*. J. Econ. Entomol. 64, 391–395.
- 488 Kilgore, W. W., and Marei, N. M. 1972. Effect of the chemosterilant *P*, *P*-bis(1-aziridinyl)-*N*-(3-methoxypropyl) phosphinothioic amide on esterases of the housefly. J. Econ Entomol. 65: 1568–1573
- 489. \_\_\_\_\_, Kilgore, W. W., and Painter, R. R. 1970 Metabolism of nucleic acids and proteins of normal and chemosterilized houseflies during organisms and embryogenesis. J. Econ. Entomol. 68: 1777-1783.
- 490 , Kilgore, W. W., and Pamter, R. R. 1971 Effect of the chemosterilant P, P'-bis(1-aziridinyl)-N-(3-methoxypropyl)phosphinothioc acid on ribosomal RNA and ribosomal protein in the eggs of houseflies, J. Econ. Entomol. 64: 371-374.
- Kilgore, W. W., and Painter, R. R. 1971. Protein synthesis by ribosomes from eggs of normal and thiotepa-chemosterilized houseflies. J. Econ. Entomol. 64, 819-821.
- 492. ——, Kilgore, W. W., and Painter, R. R. 1972. Effect of the chemosterilant P,P'-Bis(1-aziridinyl)-N-(3methoxypropyl)-phosphinothioic amide on some dehydrogenases during oogenesis and embryogenesis of the housefly. J. Econ. Entomol. 65: 37-40.
- 493. , Kilgore, W. W., Painter, R. R., and Marei, N. M. 1972. Effect of thiotepa on ribosomal protein of housefly eggs. J. Econ. Entomol. 65; 1176-1177.
- 494. ——, and Stafford, E. M. 1971. Effect of vapor and residual chemosterilants on reproduction of adult Drosophila melanogaster. J. Econ. Entomol. 64: 1521-1524.
- and Stafford, E. M. 1971. Some behavioral effects of metepa and tretamine on *Drosophila melanogaster*.
   Econ. Entomol. 64: 432–436.
- 496 Gaines, T. B., and Kımbrough, R. D. 1964. Toxicity of metepa to rats With notes on two other chemosterilants. Bull. WHO 31: 737-745.
- ——, and Kimbrough, R. D. 1966. The sterilizing, carcinogenic and teratogenic effects of metepa in rats. Bull. WHO 34: 317–320.
- 498. Galley, R. A. 1967. Possible new and more selective means of pest control. Proc. Roy. Soc. Ser. B 167; 155–163.
- 499. Gangrade, G. A., and Pant, N. C. 1970. Egg viability in Cadra cautella. I. Effect of competition between normal and apholate-sterilised males. Pest Artic. News Summ. 16: 370–372.
- 500. —, and Pant, N. C 1970. Egg viability in Cadra cautella. II. Effect of sequential mating with normal and apholate-sterilized males Pest. Artic. News Summ. 16: 373-376.
- and Pant, N. C. 1970 Effect of apholate on reproductive organs of almond moth, Cadra cautella (Walker) (Lepidoptera: Phycitidae). Indian J. Entomol. 32: 134-139.
- 502. \_\_\_\_\_, and Pant, N. C. 1971. Fecundity and egg viability in Cadra cautella Walker. III. Behavior of apholate in relation to sucrose content in the vehicle. Indian J. Entomol. 2: 324-329.

- 503 Geering, Q. A., Brooker, P. J., and Parsons, J. H. 1965. The chemosterilant activity of some substituted phenyl esters of aziridine-1-carbovylic acid. J. Econ. Entomol. 58, 574-575.
- 504. Geier, P. W., and Wilson, A. G. L. 1966. Codling moth (control with chemosterilant tepa). Aust. Commonw. Sci. Ind. Res. Org. Div. Entomol. Ann. Rep. 1965-66, pp. 50-51.
- 505. Gemrich, E. G. 1972 Effect of polyene antibiotics on the growth and development of the housefly. J. Econ. Entomol. 65 1552-1554.
- 506. Gentry, C. R., Young, J. R., and Burton, R. L. 1973. Effectiveness of blacklight-chemosterilant feeder and *Trichogramma* spp. in reducing egg hatch of *Heliothus* spp. in a large field cage, Environ. Entomol. 2: 159-160.
- Gentry, J. W. 1971. Evaluation of rat cradication programs. Environ. Sci Technol. 5: 704-709.
- 508. George, J. A., and Brown, A. W. A. 1967. Effect of the chemosterilant hempa on the yellow-fever mosquito and its liability to induce resistance. J. Econ. Entomol. 60, 974–978.
- Georghiou, G. P. 1965. Effects of carbamates on housefly fecundity, longevity, and food intake. J. Econ. Entomol. 58: 58-62.
- 510. Giannakakis, A., and Fletcher, B. S. 1974. Production of release of sex pheromone in *Dacus tryom* males sterilized with the aziridine derivative HMAC. J. Econ. Entomol. 67: 3-4.
- Gilbert, E. E. 1966. Insect chemosterilants, triphenyl tin compounds. U.S. Patent 3,247,055.
- 512. Gilliland, F. R., Jr., and Davich, T. B. 1966. Effects on egg hatch of alternate matings of female boll weevils with apholate-treated and untreated males. J. Econ. Entomol. 59: 1209–1211.
- 513. ——, and Davich, T. B. 1968. Influence of population density on mating behavior of chemosterilized, untreated, or overwintered boll weevils, *Anthonomus grandis* (Coleoptera: Curculionidae). Ann. Entomol. Soc. Amer. 61: 834-836.
- 514. ——, and Davich, T. B. 1968. Sexual competitiveness of male boll weevils sterilized with apholate unaffected by diet. J. Econ. Entomol. 61: 852–858.
- 515. Gilmour, D. 1966. Chemosterilization of the Queensland fruit fly. Aust. Commonw. Sci. Ind. Res. Org. Div. Entomol. Ann. Rep. 1965-66, 19-26.
- Glancey, B. M. 1965. Hempa as a chemosterilant for the yellow-fever mosquito *Acdes aegypti* (L.) (Diptera: Culicidae). Mosq. News 25: 392-396.
- 517. Godan, D. 1969. Investigations on the effect of herbicides on *Drosophila melanogaster* Mg. I. Population density, duration of development and body-size in the course of ten generations. Z. Angew. Zool, 56: 89-117. [In German.]
- Goebels, M. T. 1969. What's new in farm chemicals. Citrus Vet. Mag. (Jan., 1969) 32: 16.
- Goldman, M. C. 1968. Look what's happening to insect control. Org. Gard. Farming 15: 56-60.
- 520. Goldsmith, E. D. 1955. Azaserine and the development of the fruit-fly, *Drosophila melanogaster*, Fed. Proc. Fed. Amer. Soc. Exp. Biol. 14, 59.
- 521 1958. The effect of 5-fluoroorotic acid on the development of the fruit fly, Drosophila melanogas Anat. Rec. 131: 559.

- and Frank, I 1952 Sterulty in the female fruit fly, Drosophila melanogaster, produced by the feeding of a folie-acid antagonist. Amer. J. Physiol. 171: 726-727
- 523 \_\_\_\_\_, and Hamly, M. H 1964 The comparative toxicity of thiourea to four mutants of *Drosophila* melanogaster. Science 103, 649.
- 524. —, Harnly, M. H. and Tobias, E. B. 1950. Folic acid analogs in lower animals. I. The insects. Drosophila melanogaster. Ann. N. Y. Acad. Sci. 52, 1342.
- 525 \_\_\_\_\_, Tobias, E B, and Harly, M H. 1948. Folic acid antagonists and the development of *Drosophila* melanogaster. Anat Rec. 101; 93
- 526. Golomb, F. M. 1963. Agents used in cancer chemotherapy. Amer. J. Surg. 105: 579-590.
- 527 Goonewardene, H. F. 1965. Method and compositions for chemosterilization of insects. U.S. Patent 3,226,289.
- 528. . 1967. Insect sterilant, Chem. Abstr. 67: 10135.
- 529. Gouck, H. K. 1964. Chemosterilization of houseflies by treatment in the pupal stage J. Econ Entomol 57-239-241
- 530 Crystal, M. M., Borkovec, A. B., and Meifert, D. W. 1963 A comparison of techniques for screening chemosterilants of houseflies and screwworm flies, J. Econ Entomol 56, 506-509.
- ——, and LaBrecque, G. C. 1963 Studies with compounds affecting the development of housefly larvae.
   U.S. Dep. Agric, Agric. Res. Serv. [Rep.] No. ARS-33-87, 8 pp.
- and LaBrecque, G. C. 1964. Chemicals affecting fertility in adult houseflies. J. Econ. Entomol. 57: 663-664.
- Menfert, D. W., and Gahan, J. B. 1963. A field experiment with apholate as a chemosterilant for the control of houseflies. J. Econ. Entomol. 56: 445–446.
- 534 Graham, O. H. 1962. Research on chemosterilants for the control of livestock insects. Proc. North Cent. Branch Entomol. Soc. Amer. Vol. XVII.
- and Diummond, R. O. 1964. Laboratory screening of insecticides for the prevention of reproduction of Boophilus ticks J. Econ. Entomol. 57: 335-339.
- Drummond, R. O., and Diamant, G. 1964. The reproductive capacity of female Boophilus annulatus collected from cattle dipped in arsenic or coumaphos.
   J. Econ Entomol. 57: 409–410.
- Granhall, I 1972. Practical non-chemical plant protection methods. Vaextskyddsnotiser 36; 23-28.
- 538. Grant, G. G., Carmichael, A. G., Smith, C. N., and Brown, A. W. A. 1970. Autochemosterilization of the southern house mosquito by means of a modified light trap. J. Econ Entomol. 63: 648-650.
- 539. Greenberg, B. 1970. Sterilizing procedures and agents, antibiotics and inhibitors in mass rearing of insects Bull. Entomol. Soc. Amer. 16: 31-36.
- 540. Grosch, D. S. 1959. The effects of feeding antimitotic substances to adult female *Habrobracon (Microbra*con) hebetor (Say) (Hymenoptera, Braconidae). Ann. Entomol. Soc. Amer. 52; 294-298.
- 1962. Distribution of zinc-65 in the wasp, Habrobracon, and its effect on reproduction. Nature (Lond.) 195: 356-358.
- 1968. Insect fecundity and fertility: Chemically induced decrease. Science 141: 732-733.
- 548. ———. 1971. Response of the female arthropod's reproductive system to radiation and chemical agents.

- Symp. Steril Princ Insect Control Erad Proc. IAEA Proc. Ser. STI/PUB/265, pp. 217-228
- 544 , Lin, J. C-H , and Smith, R. H. 1965 The distribution of nickel-63 in *Habrobracon*. Radiat. Res. 25: 24.
- 545. ——, Sullivan, R. L., and LaChance, L. E. 1956. The comparative effectiveness of four beta-emitting isotopes fed to *Habrobracon* females on production and hatchability of eggs. Radiat. Res. 5: 281–289.
- 546 , and Valcovic, L R 1964. Genetic analysis of the effects of apholate. [Abstr.] Bull. Entomol. Soc Amer 10: 163.
- 547. ——, and Valcovic, L. R. 1967. Chlorinated hydrocarbon insecticides are not mutagenic in *Bracon hebetor* tests. J. Econ. Entomol. 60: 1177-1179.
- 548 Grover, K. K., and Pillai, M. K. K. 1969. Chemosterilization of Culex pipiens fatigans Wiedemann by exposure of aquatic stages 2 Sterilization potential of certain phosphoramides and s-triazines. Bull. WHO 41: 929-936.
- 549. ——, and Pillai, M. K. K 1970. Mating ability and permanency of sterrlity in hempa-sterilized males of the yellow-fever mosquito, Aedes aegypti. J. Med. Entomol. 7: 198–204.
- 550 ——, and Pillai, M. K. K. 1970. The mating ability of males of *Culex pipiens fatigans* Wiedemann sterilized with apholate or tepa. Bull. WHO 42; 807–816.
- 551. ——, and Pillai, M. K. K. 1972. Chemosterilization of Culex pipicus fatigans Wiedemann by exposure of aquatic stages. 3. Induction of dominant lethal mutations in the F<sub>1</sub> generation by certain aziridines, phosphoramides, and s-triazines. Bull. WHO 47: 305-308.
- 552 Pillai, M. K. K., and Dass, C. M. S. 1967. Effect of certain alkylating and nonalkylating chemosterilants on Culex fatigans. Curr. Sci. 36: 625-627.
- 553. ——, Pıllai, M. K. K., and Dass, C. M. S. 1971. Cytogenetic basis of chemically induced sterility in Culex pipiens fatigans Wiedemann. III. Effect of apholate and hempa on DNA synthesis in the gonads. Indian J. Exp. Biol. 9: 150-153.
- 554. ——, Pillai, M. K. K., and Dass, C. M. S. 1972. Cytogenetic basis of chemically induced sterility in Culex pipiens fatigans Wiedemann. II. Cytopathological effects of certain chemosterilants on the gonadal and embryonic tissues. J. Med. Entomol. 9: 451-460.
- 555. ——, Pillai, M. K. K., and Dass, C. M. S. 1973. Cytogenetic basis of chemically induced sterility in Culex pipiens fatigans Wiedemann. I. Chemosterilant-induced damage in the somatic chromosomes Cytologia 38: 21-28.
- 556. Gruner, Par L. 1966. Les chimiosterilisants des insectes. Rev. Zool. Agric. Appl. 65: 1–40.
- 557. ——. 1968. Contribution à l'étude de l'ovogènese d'un Dynastide, Phyllognathus silenus F., essais préliminaires de chimiostérilisation. Ann. Epiphyt. 19: 267-304.
- 558. Guerra, A. A. 1970. Effect of biologically active substances in the diet on development and reproduction of Heliothis spp. J. Econ. Entomol. 63: 1518-1521.
- 1972. Sterility induced in tobacco budworms by combination of reserpine and gamma irradiation affected by age and sex of pupae, J. Econ. Entomol. 65: 1282–1283.
- 560. ——, Wolfenbarger, D. A., and Garcia, R. D. 1973. Activity of juvenile hormone analogs against the to-

- bacco budworm J Econ Entomol 66; 833-835.
- Wolfenbarger, D. A., Hendricks, D. E., Garcia, R. D., and Raulston, J. R. 1972. Competitiveness and behavior of tobacco budwoims sterilized with reserpine and gamma irradiation. J. Econ. Entomol. 65: 966-969.
- Wolfenbarger, D. A., and Lukefahr, M. J. 1971
   Effects of substerilizing doses of reserpine and gamma irradiation on reproduction of the tobacco budworm.
   J. Econ Entomol. 64: 804-806.
- 563. Gul'chinskaya, V. A., and Sochilm, E. G. 1971. Initial evaluation of some embichin compounds as chemosterilants of the codling moth and the fall webworm. In Kishinev (ed.), Biological Methods of Protecting Fruit and Vegetable Crops From Pests, Diseases, and Weeds as Bases for Integrated Systems, pp. 155-156. V. I. Leningrad Academy of Agricultural Sciences, Leningrad.
- 564. Gwiazda, M. 1965. Chemosterilants for control of Cochlomyia hominivorax. Ochr. Rosl. 9: 10-12.
- 565. ——. 1968. Sternlizing properties of hexakis(aziridinyl)-phosphonitrilate (apholate) on the housefly, Musca domestica. Polon. Pismo Entomol. 38: 633-637, [In Polish.]
- Gwynn, G. W. 1972. Field trial of a chemosterilant in wild Norway rats. J. Wildl. Manage. 36: 823–828.

#### H

- 567. Hafex, M., Aboul-Nasr, A. E., and Salama, H. S. 1969. Studies on the control of mosquitoes in Egypt by means of chemosterilants. I. Chemosterilization of Anopheles pharoensis. J. Econ. Entomol. 62: 233–234.
- 568. ———, Aboul-Nasr, A. E., and Salama, H. S. 1970. Studies on the control of mosquitoes in Egypt by means of chemosterilants. II. Chemosterilization of Culex pipiens by tepa and hempa. J. Econ. Entomol. 63: 248-250.
- 569. ——, Aboul-Nasr, A. E., and Salama, H. S. 1970. Studies on the control of mosquitoes in Egypt by means of chemosterilants. III. Sterilization of Anopheles pharoensis and Culex pipiens by metepa. J. Econ. Entomol. 63: 1169-1172.
- 570. ——, Aboul-Nasr, A. E., and Salama, H. S. 1970. Studies on the control of mosquitoes in Egypt by means of chemosterilants. IV. Sterilization of Anopheles pharoensis and Culex pipiens by apholate and thiotepa. J. Econ. Entomol. 64: 675-678.
- Osman, M. F., El-Ziady, S., El-Moursy, A. A., and Erakey, M. A. S. 1969. Studies on control of houseflies in Egypt by chemosterilants. I. Laboratory studies on Musca domestica vicina. J. Econ. Entomol. 62: 324-329.
- 572. ——, Osman, M. F., and Erakey, M. A. S. 1970. Studies on control of houseflies in Egypt by chemosterilants. II. Effect of metepa on *Musca sorbens*. J. Econ. Entomol. 63: 213–214.
- 573. ——, Osman, M. F., and Erakey, M. A. S. 1970. Studies on control of houseflies in Egypt by chemosterilants. III. Sterilization of *Musca sorbens* by apholate, tepa, and hempa, J. Econ. Entomol. 63: 1167-1169.
- 574. ——, Osman, M. F., and Erakey, M. A. S. 1971. Studies on control of houseflies in Egypt by chemosterilants. IV. Laboratory evaluation of chemosterilant baits on

- Musca domestica vicina J Econ. Entomol. 64: 979-981
- 575 Osman, M. F., and Omar, M. S. 1971. Studies on control of houseflies in Egypt by chemosterilants. V. Mating competitiveness of laboratory and wild strains of Musca domestica vicina. J. Econ. Entomol. 64: 967-969.
- 576. ——, Wahab, A. M. A., and Rizk, G. A. 1971. Laboratory evaluation of tepa, metepa, apholate and hempa as chemosterilants for the lesser cotton leafworm Spodoptera exigua (Hubn.). Z. Angew. Entomol. 68: 378–386.
- 577 Hair, J. A., and Adkins, T. R., Jr. 1964. Sterilization of the face fly, *Musca autumnalis*, with apholate and tepa J. Econ. Entomol. 57: 586-589.
- 578. ——, and Turner, E. C., Jr. 1966. Susceptibility of mature and newly emerged face flies to chemosterilization with apholate. J. Econ Entomol. 59: 452-454.
- 579. Hamilton, E. W., and Sutter, G. R 1969. Chemosterilizing southern corn rootworm beetles with apholate. J. Econ. Entomol. 62: 1285–1288.
- Hamm, P. C. 1970. Insect chemosterilants containing an acetylmelamine. U.S. Pat. 3,520,974.
- 1971. Haloethyl ethyleneglycol phosphites as insect chemosterilants. U.S. Pat. 3,562,390.
- 1971. Halogenated phosphonates for chemosterilizing screwworm flies. U.S. Pat. 3,577,538.
- 583. . 1972. Chemosterilant 2-{p-(2-halo-N-alkyl-acetamido)phenoxylacetic acids for flies. U.S. Pat. 3,671,635.
- 584. Haniotakis, G. E. 1973. Sexual competitiveness of metepa-sterilized males of *Dacus olcae*. Environ. Entomol. 2: 781-736.
- 585. ——, and Galachtiou, C. G. 1978. Metepa sterilization of the olive fruit fly. J. Econ. Entomol. 66: 55-61.
- Hansberry, R. 1968. Prospects for nonchemical insect control—An industrial view. Bull. Entomol. Soc. Amer. 14: 229-235.
- Hansens, E. J. 1965. Effects of apholate on restricted populations of insecticide-resistant houseflies, Musca domestica. J. Econ. Entomol. 58: 944-946.
- and Granett, P. 1965. Effects of apholate on a restricted population of houseflies. J. Econ. Entomol. 58: 157–158.
- Harding, J. A. 1967. Chemosterilization of male European corn borers by feeding of tepa and apholate to larvae.
   J. Econ. Entomol. 60: 1631–1632.
- 590. Harnly, M. H., and Goldsmith, E. D. 1946. The effect of thiourea on the development of *Drosophila* melanogaster. Anat. Rec. 96: 70.
- 591. ——, and Goldsmith, E. D. 1950. Effects of thiourea, thiouraeil, phenylthiourea, and propylthiouraeil on

592

- spotted spider mite on fruit seedlings treated with chemicals J. Econ. Entomol. 59, 501-506
- 596 ———— 1967. Fecuadity and mortality of female codling moth treated with novolucian and other antibiotics. J. Econ. Entomol. 60, 7-10
- 597 \_\_\_\_\_ 1968 Further studies of effects of antibiotics and other compounds on fecundity and mortality of the two-spotted spider mite. J. Econ. Entomol. 61: 12-14
- 598 —, and Mattson, V J 1963 Effects of some antibiotics on three aphid species J. Econ. Entomol. 56: 412-414
- 599 ——, and Wiles, W. G. 1966. Tests of some antibiotics and other chemosterilants on the green peach aphid. J. Econ. Entomol. 59, 694–696.
- 600 Harrs, E. J., Mitchell, W. C., Baumbover, A. H., and Steiner, L. F. 1968 Mutilation and sin vival of sterile Oriental fruit flies and melon flies emerging in drop boxes, J. Econ. Entomol. 61, 493-496
- 601. Harris, R. L. 1962 Chemical induction of sterility in the stable fly J. Econ. Entomol. 55: 882–885.
- 602 ——, and Frazar, E. D. 1963 The sensitivity of horn flies to chemosterilants. Bull. Entomol. Soc. Amer. 9 173
- 603 —, and Frazar, E. D. 1966 Chemosterilization of adult horn flies. J. Econ. Entomol. 59, 1171-1173
- 604 Hartwell, J. L. Plant remedies for cancer. Cancer Chemother. Rep. No. 7, 19-24
- 605. Harwaikar, M. R., Khaire, S. N., and Rahalkar, G. W. 1971. Chemosterilization of potato tuberworm. I Effect of metepa on the fertility of males. J. Econ Entoniol. 64, 358–361.
- 606 Hathaway, D. O., Lydin, L. V., and Butt, B. A. 1966. Effects of tepa on reproduction of codling moths. J. Econ. Entomol. 59, 851-853.
- 607. ——, Lydin, L. V., and Butt, B. A. 1968 Sterilization of codling moth by aerosol treatment with tepa. J. Econ. Entomol. 61: 322–323
- 608. ——, Lydin, L. V., and Butt, B. A. 1970. Reproduction of sexual aggressiveness of male codling moths treated with tepa or gamma irradiation. J. Econ. Entomol. 63: 1851–1883.
- 600 Hayes, W J., Ji 1963 The toxicity of chemosterilants Pharmacology 5: 63.
- 611 . 1965. Toxicological aspects of chemosterrlants. 150th Meet. Amer Chem. Soc., Sept. 12-17. Abstracts of papers, pp. 29A
- 612. \_\_\_\_\_. 1965 More efficient than killing. Agric. Chem. 20; 34,
- 613. Haynes, J. W., Hedin, P. A, and Davich, T. B. 1966. Hempa and apholate as chemosterilants for the boll weevil. J. Econ. Entomol. 59 1014-1015.
- 614 Harwalkar, M. R., and Mithn, N. 1973 Quantitative studies of Busulfan-treated diet necessary to sterilize the male boll weevil, J. Econ. Entomol. 66, 1338-1339.
- 615. Midin, N., Davich, T. B., Dawson, J. R., Woods, C. W, and Terry, P H. 1972. Chemosterilants screened against the boll weevil in dipping and feeding tests U.S Dep. Agric. Prod Res. Rep. No 141, 21 pp
- 616. ——, Mitlin, N., Davich, T. B., and Sloan, C. E. 1971.

  Evaluation of candidate chemosterulants for the boll

- weevil U.S Dep Agric Prod. Res. Rep No. 120, 24 pp
- 617 , Mitlin, N., Sloan, C. E., and Dawson, J. R. 1973.

  Busulfan. Development of improved methods of sterilizing boil weevils. J. Econ. Entomol. 66: 619-622.
- 618 Hays, S B 1965 Some effects of reserpine, a tranquilizer, on the housefly, J. Econ. Entomol. 58: 782-783.
- 619. ——, and Amerson, G. M. 1967. Reproductive control in the housefly with reserpine. J. Econ. Entomol. 60: 781-783
- 620. ——, and Amerson, G. M. 1968 Chemosterilizing activity and toxicity of P,P-bis(1-aziridinyl)-N-methylphosphinic amide and P,P-bis(1-aziridinyl)-N-(3-methoxypropyl)-phosphinothioic amide against the housefly J. Econ. Entomol. 61: 800-802.
- 621.—, and Amerson, G. M. 1968. Reproductive inhibition in houseflies with triphenyl tin acetate and triphenyl tin chloride alone and in combination with other compounds, J. Econ. Entomol. 61: 1154-1157.
- 622. \_\_\_\_\_, and Cochran, J. H. 1964. Evaluation of compounds affecting the reproductive potential of the plum curculio J. Econ. Entomol. 57: 217-219.
- 623. ——, Hays, R. L., and Mims, I. S. 1969. Comparative effects of reserpine and serotomn creatine sulfate on oviposition in the housefly. Ann. Entomol. Soc. Amer. 62, 663-664.
- 624 Hazard, E. I., Lofgren, C. S., Woodard, D. B., Ford, H. R., and Glancey, B. M. 1964. Resistance to the chemical sterilant, apholate, in *Acdes aegypti*. Science 145: 500-501.
- 625. Hedin, P. A., Cody, C. P., and Thompson, A. C., Jr. 1964. Antifertility effect of the chemosterilant apholate on the male boll weevil. J. Econ. Entomol. 57: 270-272.
- 626. ——, Vickers, D. A., Bartlett, A. C., Wiygul, G., and Mitlin, N. 1965 Sterilizing effects of tepa on the boll weevil. 150th Meet. Amer. Chem. Soc., Sept. 12–17. Abstracts of papers, p. 27A.
- 627. ——, Wiygul, G., and Mitlin, N. 1967. Absorption and metabolism of C<sup>14</sup>-labeled tepa by the boll weevil. J. Econ Entomol. 60; 215–218.
- 628 , Wiygul, G., Vickers, D. A., Bartlett, A. C., and Mitlin, N. 1967. Sterility induced by tepa in the boll weevil: Effective dose and permanency, gonadal changes, and biological turnover of labeled compounds. J. Econ. Entomol. 60: 209-214.
- Hegdekar, B. M. 1970. Amino acid analogues as inhibitors of insect reproduction. J. Econ. Entomol. 63: 1950–1956.
- Hemsworth, B. N., and Jackson, H. 1962. Effect of Busulphan on the developing gonad of the male rat. J. Reprod. Fert. 5: 187-194.
- 631. —, and Jackson, H. 1962 Effect of Busulphan on the developing ovary in the rat. J. Reprod. Fert. 6: 229-233.
- 632. Henneberry, T. J., and Kishaba, A. N. 1966. Effects of some chemosterilants on the viability of eggs, fecundity, mortality, and mating of the cabbage looper. J. Econ. Entomol. 59: 156-159.
- 633. ——, Kishaba, A. N., Iqbal, M. Z., and Klingler, B. B. 1968. Reproduction, longevity, and flight of cabbage looper moths treated topically with tepa. J. Econ. Entomol. 61: 1536-1540.
- 684. ——, Mason, H. C., and McGovern, W. L. 1967. Some effects of gamma radiation and apholate on the fertility

- of  $Drosophila\ metanogaster,\ J.\ Econ\ Entomol.\ 60\ 853-857.$
- 635 ——, Shorey, H. H., and Kishaba, A. N. 1966. Mating frequency and copulatory aberrations, response to female sex pheromone, and longevity of male cabbage loopers treated with tepa. J. Econ. Entomol. 59: 573-576.
- 636 ——, Smith, F. F., and McGovern, W. L. 1961. Some effects of gamma radiation and a chemosterilant on the Mexican bean beetle. J. Econ. Entomol. 57: 813–815.
- Stimmann, M. W., and Harrell, S. 1972. Effects of tepa and metepa on the reproductive tissues of cabbage looper moths. J. Econ. Entomol. 65: 93-97.
- Herranen, A. 1964. Effect of alkylating agents and whole-body X-irradiation on thymus. Nature (Lond.) 203: 891–892.
- 639. Herrick, R. B., and Sherman, M. 1964. Effect of an alkylating agent, apholate, on the chicken. Poult. Sci. 43: 1327-1328.
- 640 , and Sherman, M. 1966. Subacute toxicity of apholate to the mature chicken. Toxicol. Appl. Pharmacol. 9: 293–299.
- Herskowitz, I. H. 1951. A list of chemical substances studied for effects on *Drosophila*. Amer. Nat. 85: 181-199.
- 642. ——. 1956 Mutagenesis in mature *Drosophila* spermatozoa by "triazine" applied in vaginal douches. Genetics 41: 605.
- 643. Heston, W E., Vlahakis, G., and Desmukes, B. 1973. Effects of the antifertility drug enovid in five strains of mice, with particular regard to carcinogenesis. J. Nat. Cancer Inst. 51: 209–224.
- 644. Higdon, H. 1970. Well, if not DDT, then what? N.Y. Times Mag., Jan. 11, 1970, 26, 27, 48, 50, 52, 53, 55, 58.
- 645. Hinton, T. 1952. A quantitative study of folic acid requirements and reversal of aminopterin inhibition in *Drosophila*. Science 116: 708-710.
- 646 Hintze-Podufal, C., and Fricke, F. 1971. The effect of farnesol derivatives on the mature larva of *Cerum* vinula L. (Lepidoptera). J. Insect Physiol. 17: 1925-1932.
- 647. Hirano, C. 1965. The induction of sexual sterility in the silk-worm moth by an alkylating agent, apholate. Botyu-Kagaku 30: 109-14.
- 648. Hitchings, D. L. 1967. Bacillus thuringiensis: A reproduction inhibitor for southern armyworm. J. Econ. Entomol. 60: 596-598.
- 649. Hodgson, E. 1963. Effect of thahdomide on the growth and reproduction of *Phormia regina*. J. Econ. Entomol. 56; 720.
- 650. Hoffman, A. C., and Grosch, D. S. 1972. The effects of ethyl methane sulfonate on the fecundity and fertility of Bracon (Habrobracon) females. I. The influence of route of entry and physiological state. Pest. Biochem. Physiol. 1; 319–326.
- Hoffman, J. D., and Dickerson, W. A. 1970. A field study of male tobacco hornworms sterilized with tepa. J. Econ. Entomol. 63: 1714-1715.
- 652. ———, and Dickerson, W. A. 1972. Sterilization of adult male tobacco hornworms with tepa. J. Econ. Entomol. 65: 301–302.
- 653. Holcomb, R. W. 1970-71. Insect control: Alternatives to the use of conventional pesticides. World Rev. Pest Control 9: 156-160.

- 654. Holmsen, T. W., and Leasure, J. K. 1966. Growth-inhibiting action of tris(1-aziridinyl)phosphine oxide in grasses. Science 153: 1659.
- 655. Hooper, G. 1969 Chemosterilant studies at the University of Queensland, Australia. 3cmc Congres Internazional des Antiparasitaires, Milan (Oct. 6–8, 1969), pp. 291–294.
- 656 Hora, J. 1968. On steriods; 70 Insect chemosterilants derived from 21-hydroxypregnane-6,20-dione. Coll Czech. Chem. Commun. 34: 344-348.
- 657 Horwitz, S. B. 1971 Chemosterilant action of anthramycin. A proposed mechanism. Science 174: 159-161.
- 658. Howard, W. E. 1967. Biocontrol and chemosterilants. In W. W. Kilgore and R. L. Doutt (eds.), Pest Control, pp. 374-383. Academic Press, New York.
- 659. ——, and Marsh, R. E. 1969. Mestranol as a reproductive inhibitor in rats and voles. J. Wildl. Manage, 33: 403–408.
- 660. Howland, A. F., Vail, P., and Henneberry, T. J. 1965. Effect of chemosterilants on fertility of cabbage loopers, J. Econ. Entomol. 58; 635-637.
- Wail, P., and Henneberry, T. J. 1966. Results of cage experiments with sterile male releases and a chemosterilant technique for control of cabbage looper populations. J. Econ. Entomol. 59: 194-196.
- 662. Hudson, C. B., and Pino, J. A. 1952. Physiological disturbance of the reproductive system in white leghorn cockerels following the feeding of enhaptin. Poult. Sci. 31: 1017–1022.
- 663. Hughes, A. M., and Glass, L. E. 1965. Histological investigations of the mechanism of sterility induced by deuterium oxide in mice. Nature (Lond.) 208: 1119-1120.
- 664. Hunter, P. E. 1961. Effect of captan upon reproduction in the two-spotted spider mite, *Tetranychus telarius*. J. Econ. Entomol. 54: 204~206.
- 665. Huot, L., and Corrivault, G. W. 1967. Les substances neuroleptiques et le comportement des insectes. V. Étude comparative de l'action de la réserpine et de quelques-uns de ses dérives sur le *Tribolium* confusum Duval. Arch. Int. Physiol. Biochim. 75: 745-753.
- 666. , Corrivault, G. W., and Bourbeau, G. 1960. Les substances neuroleptiques et le comportement des insectes. I. Influence de la réserpine sur la ponte de *Tribolium confusum* Duval (Coléoptère: Tenebrionidae), Arch. Int. Physiol. Bjochim. 68: 577-585.
- 667. Hussein, E. M. K. 1966. The effects of chemosterilants on Lygus hesperus Knight. Diss. Univ. Calif., Davis, Grad. Div., Jan. 1966, 56 pp.

#### Ĭ

- 668. Iba, M., and Hirano, C. 1972. Fecundity of and hatch of eggs from mulberry leaf beetle, Fleutiauxia armata Baly (Col., Chrysomelidae), treated with thiotepa, metepa, tepa, and hempa. Botvu-Kagaku 37: 60.
- 669. Inashchenko, I. I., and Adamenko, E. A. 1971. Biological activity of the sexual attractant of females and the possibility of the chemical sterilization of Agriotes litigiosus. S-KH Biol. 6: 407-410.
- 670. Ivanova, T. V. 1970. Effect of thio-tepa on the reproductive functions of the turnip moth. Byull. Vses. Nauchno Issled. Inst. Zashch. Rast. 7(2): 31-37. [Ir Russian.]

- 671 Jackson, H 1958 The effects of radiomimetic chemicals on the fertility of male rats. J. Fac. Radiol. Lond. 9: 217-220
- 672. 1959 Antifertility substances Pharmacol, Rev. 11 135-172.
- 673. ——. 1959 Antifertility substances Paper read Sci Meet Pharmacol. Soc., London (Dec. 3, 1959), 5 pp.
- 674. 1960 Antifertility substances Pharmaceut J. Feb. 20, 1960
- 675. Citation deleted.
- 676. . 1964. The development of antifertility substances
  Fortschr Arzneim Forsch. 7: 133-192
- 677. ——. 1964 The effects of alkylating agents on fertility. Mechanism of carcinogensis. Chemical, physical and viral. Brit Med. Bull. 20 107–114.
- 678 Citation deleted.
- 679 ———— 1966. Antifertility compounds in the male and female. Development, actions, and applications of chemicals affecting the reproductive processes of animals, insects and man. 214 pp. Charles C. Thomas Publisher, Springfield, Ill.
- 680. —, and Bock, M 1955. The effect of triethylenemelamine on the fertility of rats. Nature (Lond.) 175, 1037-1038.
- and Craig, A. W. 1966 Antifertility action and metabolism of hexamethylphosphoramide. Nature (Lond.) 212: 86-87.
- Davies, P., and Bock, M 1968. Chemosterilization of Schistosoma manson: Nature (Lond.) 218: 977.
- 683. ——, Fox, B. W., and Craig, A. W. 1959. The effect of alkylating agents on male rat fertility. Brit. J. Pharmacol. Chemother. 14: 149-157.
- Fox, B. W., and Craig, A. W. 1961. Antifertility substances and their assessment in the male rodent.
   J. Reprod. Fert 2: 447–465.
- 685 Partington, M., and Walpole, A. L. 1964. Production of heritable partial sterility in the mouse by methyl methanesulphonate Brit. J. Pharmacol Chemother 23, 521-528.
- and Schnieden, H. 1968 Pharmacology of reproduction and fertility. Annu. Rev Pharmacol. 8-467-490.
- 687. Jackson, R. D., and Brindley, T. A. 1971. Hempa and metepa as chemosterilants of imagos of the European corn borer. J. Econ. Entomol. 64: 1065–1068.
- 688. Jackson, W. B. 1972. Biological and behavioural studies of rodents as a basis for control. Bull. WHO 47; 281–286.
- 689. Jacob, J 1958. A study of colcheine induced sterility in the female fruit fly Drosophila melanogaster. Growth 22: 17.
- 690. Jakob, W. L. 1973. Insect development inhibitors. Tests with housefly larvae. J. Econ. Entomol. 66: 819-820
- 691. Jalil, M., and Morrison, P. E. 1969. Chemosterilization of the two-spotted spider mite. I. Effect of chemosterilants on the biology of the mite. J. Econ. Entomol. 62: 393-400.
- 692. ——, and Morrison, P. E. 1969. Chemosterilization of the two-spotted spider mite. II. Histopathological effect of apholate and 5-fluorouracil on the reproductive organs. J. Econ. Entomol. 62: 400–403.
- 693. ——, and Morrison, P. E. 1969. Chemosterilization of the two-spotted spider mite. III. Effect on host plant.

- J Econ Entomol 62 506-507.
- 694 and Morrison, P. E. 1969. Chemosterilization of the two-spotted spider mite. IV. Effect on population J. Econ. Entomol. 62: 415–419.
- 695. Jamnback, H 1967 Some effects of ingested thiotepa on the development of *Plasmodium gallinaceum* in yellow-fever mosquitoes and in chicks, J Econ. Entomol 60; 390-393
- 696. Jasper, R. L., Leary, J. S., Jr., and Silvers, E. L. 1965. Mammalian toxicity of two chemosterilants, hempa and hemel. 150th Meet. Amer. Chem. Soc. Sept. 12–17. Abstracts of papers, p. 30A.
- 697. Jayasekera, R. D. E., and Bell, P. R. 1972. Effect of thiouraci on the viability of eggs and embryogeny in Pteridium aquilinum. Planta 102: 206-214
- 698. Jeppson, L. R., Jesser, M. J., and Complin, J. O. 1966. Cycloheximide derivatives and mite control, with special reference to mites on citrus. J. Econ. Entomol. 59, 15–19.
- 699. Jobsen, J. A. 1965. Sterilization of insects. Entomol Ber. 25: 33. [In Dutch.]
- Johansen, C. A, and Redmond, R. D. 1965. Toxicity of apholate to the honeybee. J. Apic. Res. 4: 55-59.
- 701 Jones, A. R, and Bertram, J. S. 1968. The metabolism of hexamethylphosphoramide and hexamethylthiophosphoramide. Experientia 24: 326–327.
- 702. Joshi, S. R., Page, E. C., Arnold, E., Bishop, Y., and Epstein, S. S. 1970. Fertilization and early embryonic development subsequent to mating with tepa-treated male mice. Genetics 65: 483-494.
- Jost, E., and Amirkhanian, J. D. 1971. Comparative studies on the effect of x-rays and 1,3-propanedioldimethanesulfonate on the mosquito Culex pipiens. Mutat. Res. 13: 49-57.
- 704. Judson, C. L. 1967. Alteration of feeding behavior and fertility in *Acdes aegypti* by the chemosterilant apholate. Entomol. Exp. Appl. 10: 387-394.

#### K

- Kaloostian, G. H. 1968. Chemosterilization of male pear psylla with tepa. J. Econ. Entomol. 61: 573-574.
- 1970. Longevity, fecundity, and fertility of adult pear psylla chemosterilized with tepa, J. Econ. Entomol. 63: 1146-1148.
- Kaneko, T. 1967. Shot-hole borer of tea plant in Japan. JARQ 2(2), 19-21.
- Kaney, A. R., and Atwood, K. C. 1964. Radiomimetic action of polyimine chemosterilants in *Neurospora*. Nature (Lond.) 201; 1006.
- 709. Kaplan, W. 1954. Factors influencing the frequency of mustard-gas induced dominant lethals in D. melanogaster. Proc. IXth Int. Conf. Genet. Caryol. 6(Suppl.): 693-694.
- Kaplanis, J. N., Thompson, M. J., and Robbins, W. E. 1971. The effects of ecdysones and analogs on ovarian development and reproduction in the housefly Musca domestica (L.). Proc. XIII Int. Congr. Entomol., Moscow, 1968, p. 393.
- 711. Kappus, K. D., and Corristan, E. C. 1967. Effect of apholate and metepa on Aedes aegypti infected with Venezuelan equine encephalomyelitis virus. Amer. J. Trop. Med. Hyg. 16: 539-543.
- Kar, A. B. 1965. Sterilization of male rhesus monkeys by iron salts. J. Reprod. Fert. 9: 115-117.

- 713. ——, Bose, A. R., and Das, R. P. 1963. Effect of m-xylohydroquinone on the genital organs and fertility of male rats. J. Reprod. Fert. 5, 77-81.
- 714. Karnofsky, D. A. 1961 Cancer chemotherapeutic agents. 8 pp Reprinted from Ca Cancer J Chn. Mar -Apr., 1961.
- 715 ——, and Clarkson, B. D. 1963. Cellular effects of anticancer drugs. Annu Rev Pharmacol 3: 357
- 716. Kaur, D., and Steve, P. C. 1969. Induced sterility in face fly—Initial and sustained effects of hempa and metepa J. Econ. Entomol. 62: 1462-1464.
- 717. ——, and Wentworth, B. C. 1972. Studies on the chemosterilization of the face fly. J. Econ Entomol. 65: 21-22.
- Kearns, D. R., and Nair, K. K. 1972. Physiological studies on effects of tepa on Schistocerca gregaria. Ann. Entomol. Soc. Amer. 65: 216–221.
- 719. Keiser, I., and Schneider, E. L. 1969. Longevity, resistance to deprivation of food and water, and susceptibility to malathion and DDT of Oriental fruit flies, melon flies, and Mediterranean fruit flies sexually sterilized with tepa or radiation, J. Econ. Entomol. 62: 663-667.
- Steiner, L. F., and Kamasaki, H. 1965. Effect of chemosterilants against the Oriental fruit fly, melon fly, and Mediterranean fruit fly. J. Econ. Entomol. 58: 682-685.
- Kenaga, E. E. 1964. Triphenyl tin compounds as insect reproduction inhibitors. Proc. XII Int. Congr. Entomol., London (July 8-16, 1964), p. 514.
- 722. \_\_\_\_\_\_. 1965. Triphenyl tin compounds as insect reproduction inhibitors. J. Econ. Entomol. 58: 4-8.
- 723. ———. 1969. Some hydroxynitrosamino aliphatic acid derivatives as insect reproduction inhibitors. J. Econ. Entomol. 62: 1006–1008.
- 724. ——. 1971. Sterilizing insects with triaryltin compounds. U.S. Pat. 3,577,548,
- 725. Kendle, K. E., Lazarus, A., Rowe, F. P., Telford, J. M., and Vallance, D. K. 1973. Sterilization of rodent and other pests using a synthetic estrogen. Nature (Lond.) 244: 105-108.
- Khan, M. A. 1963. Toxicity of apholate to cattle. Can. J. Comp. Med. Vet. Sci. 27: 233-236.
- 727. Khvatova, L. P. 1965. Sterilization of Fraxinus pests. Z. Rast. Vred. Bolezn. 12: 51-52.
- 728. Kido, H., and Stafford, E. M. 1966. Some effects of thiotepa on *Drosophila melanogaster Meigen*. J. Econ. Entomol. 59: 1064-1069.
- Kihlman, B. A. 1966. Actions of chemicals on dividing cells. 260 pp. Prentice-Hall, Inc., Englewood Cliffs, N.J.
- Kilgore, W. W. 1965. Biochemistry of insect sterilants.
   150th Meet, Amer. Chem. Soc., Sept. 12-17. Abstracts of papers, p. 26A.
- 731. ——. 1967. Chemosterilants. In W. W. Kilgore and R. L. Doutt (eds.), Pest Control, pp. 197-286. Academic Press, New York.
- 732. , and Painter, R. R. 1962. The effect of 5-fluorouracil on the viability of housefly eggs. J. Econ. Entomol. 55; 710-712.
- 733. ——, and Painter, R. R. 1964. Effect of the chemosterilant apholate on the synthesis of cellular components in developing housefly eggs. Biochem. J. 92: 353-357.
- 734. \_\_\_\_\_, and Painter, R. R. 1966. Insect chemosterilants:

- Incorporation of 5-fluorouracil into housefly eggs. J. Econ Entomol 59: 746-747
- 735 ——, Painter, R. R., and Gadallah, A. I. 1971. Characteristics of the nucleic acids of eggs from houseflies fed aziridinyl compounds. J. Econ. Entomol. 64; 30–33.
- 736 Killough, R. A., and McCleman, E. S. 1969 Laboratory studies of the mating habits of the face fly J. Econ Entomol. 62: 551–555.
- Kimbrough, R. D., and Gaines, T. B. 1966. Toxicity of hexamethylphosphoramide in rats. Nature (Lond.) 211: 146-147.
- 738 ———, and Gaines, T. B. 1968. Effect of organic phosphorus compounds and alkylating agents on the rat fetus Arch. Environ. Health 16: 805-808.
- King, R. C. 1958. Effect of 5-ammo uracil upon organesis. Drosophila Info. Serv. 32: 131.
- 740. ——, and Sang, J. H. 1959. Oogenesis in adult Drosophila melanogaster. VIII. The role of folic acid in oogenesis. Growth 23: 37-53.
- Kirk, H. D., Ewen, Al B., Emson, H. E., and Blair,
   D. G. R. 1971. Effect of aflatoxin B, on development of Drosophila melanogaster (Diptera). J. Invertebr. Pathol, 18: 313-315.
- 742. Kishaba, A. N., Henneberry, T. J., Hancock, P. J., and Toba, H. H. 1967. Laboratory technique for studying flight of cabbage looper moths and the effects of age, sex, food, and tepa on flight characteristics. J. Econ. Entomol. 60: 359-366.
- 748. Kishin, A. F. 1961. Formaldehyde induces changes m male and female germ cells of *Drosophila melano*gaster Alexandria. J. Agric, Res. 9: 39-53.
- 744. Kissam, J. B., and Hays, S. B. 1966. Mortality and fertility response of *Musca domestica* adults to certain known mutagenic or anti-tumor agents. J. Econ. Entomol. 59: 748-749.
- 745. ——, Wilson, J. A., and Hays, S. B. 1967. Selective effects of certain anti-fertility compounds on the housefly as shown by reciprocal crosses and histological sectioning. J. Econ. Entomol. 60; 1130–1135.
- Kitaoka, S., and Morii, T. 1967. Effects of gamma radiation and chemosterilants on the cattle tick, Boophilus microplus. Jap. J. Sanit. Zool. 18(2/3): 126-129.
- Klassen, W., and Chang, T. H. 1966. Tris(1-aziri-dinyl)phosphine oxide: Caution on use. Science 154: 920.
- 748. ———, Chang, T. H., and Eide, P. E. 1969. Effects of apholate on chromosomes of germ cells in the grasshopper testes. Can. J. Genet. Cytol. 11: 829-833.
- 749. \_\_\_\_\_, and Creech, J. F. 1971. Suppression of pest populations with sterile male insects. U.S. Dep. Agric. Misc. Publ. No. 1182, 8 pp.
- 750. ——, and Earle, N. W. 1970. Permanent sterility induced in boll weevils with busulfan without reducing production of pheromone. J. Econ. Entomol. 63: 1195–1198.
- and Matsumura, F. 1966. Resistance to a chemosterilant, metepa, in *Aedes aegypti* mosquitoes. Nature (Lond.) 209: 1155-1156.
- Norland, J. F., and Borkovec, A. B. 1968. Potential chemosterilants for boll weevils, J. Econ. Entomol. 61: 401-407.
- 768. ——, Norland, J. F., and Briggs, R. W. 1969. Sterilization of boll weevils with combinations of chemoster" ants and X-rays, gamma rays, thermal neutro

- fast neutrons J Econ Entomol. 62: 1204-1216
- 754. Kloft, W. 1967. Insects destroy themselves. Entomol Gesell Basel 17(3): 78–87
- 755. Knipling, E F 1955. Possibilities of insect control or eradication through the use of sexually sterile males. J.Econ Entomol. 48: 459–462
- 756. ———, 1958. Sciewworm eradication Concepts and research leading to the sterile-male method. Smithson. Inst. Annu Rep., pp. 409-418.
- 757. ——. 1959. Sterile-male method of population control Science 130: 902-904
- 759. —— 1962. The sterility principle of population control Proc. 1st Int Conf Wildl. Dis. Assoc., High View, N Y, June 24-27
- 760 —— 1962. Potentialities and progress in the development of chemo-terilants for insect control J. Econ. Entomol 55 782-786.
- 761. ——. 1963. The potential role of the sterility method for insect population control with special reference to combining this method with conventional methods.
   U.S. Dep. Agric., Agric. Res. Serv. [Rep.] No. ARS-33-98, 54 pp.
- 762. ——. 1964. The sterility principle of insect population control. Pest. Abstr. News Summ. Sect. A, 10: 587-603
- 763. ——. 1965. The sterility method of pest population control Proceedings of a Conference on Research Needs and Approaches to the Use of Agricultural Chemicals from the Public Health Viewpoint, University of California, Davis (Oct. 1-3, 1965), pp. 233-249.
- 764. 1965. Sterile males and insecticides offer hope for boll weevil eradication. Agric. Chem 20(6) 29-30, 123
- 765. ———. 1966. Some basic principles in insect population suppression, Bull. Entomol Soc Amer. 12 7-15.
- 766. \_\_\_\_\_\_. 1967. The role of chemicals in the general insect control picture. Bull. Entomol. Soc Amer. 14: 102-107.
- 767. —— 1968. The potential role of sterility for pest control In G. C. LaBrecque and C. N. Smith (eds.), Principles of Insect Chemosterilization, pp. 7-40, North-Holland Publishing Co., Amsterdam.
- 768. , Laven, H., Craig, G. B., Jr., Pal, R., Kitzmiller, J. B, Smith, C. N., and Brown, A. W. A. 1968. Genetic control of insects of public importance. Bull. WHO 38, 421-438.
- 769. ——, and McGuire, J. U 1972. Potential role of sterilization for suppressing rat populations U.S. Dep. Agric. Tech. Bull. No 1455, 27 pp.
- 770. Knutson, H. 1955 Modifications in fecundity and life span of *Drosophila melanogaster* Meigen following sublethal exposure to an insecticide. Ann. Entomol. Soc. Amer. 48: 35-39
- ———. 1959. Changes in reproductive potential in houseflies in response to dieldrin. Entomol. Soc. Amer. Misc. Publ. 1; 27–32.
- Kohls, R. E., Lemin, A. J., and O'Connell, P. W. 1966.
   New chemosterilants against the housefly. J. Econ. Entomol. 59: 745-746.
- Koike, H. 1971. Insect chemosterilants. Hoyaku Seisan Gijutsu 26: 1–13. [In Japanese.]
- 774. Konecky, M. S., and Mitlin, N. 1955. Chemical impair-

- ment of development in houseflies J. Econ. Entomol. 48: 219-220.
- 775 Koshy, T , and Chandra, K R. 1972. New approaches to the control of harmful msects J Sci Ind Res 31: 515-523.
- 776. Kropachova, A. A., and Khvatova, L. P. 1973. Chemosterilization of Zeuzera pyrma. Fruit pests, control, Khim. Sel. Khoz. 11, 763-764 [In Russian.]
- 777 , Sukhova, M. N., Stepanova, M. N., Teterovskaya, T. O., Artyukhma, I. N., and Gvozdeva, I. V. 1969. Les dérives nouveaux du azırıdıne le dipime le pyrimide, le morphimide, le phosphimide et leurs propriétés stérilisantes a l'égard des mouches synanthropes et certains autres insectes. 3ème Congrès Internazional des Antiparasitaires, Milan (Oct. 6-8, 1969), pp. 301-308
- 778. Krzeminska, A. 1972 Sterihzation of *Blatella germanıca* (Cockroach) with metepa Wiad. Parazytol 18(4-6): 643-646
- 1973. Sterilizing effect of some organotin compounds on the housefly, Musca domestica Rocz. Nauk Roln. Ser. E 3(2), 139-147.
- 780. Kuipers, J. 1962. Het effect van sublethale doses van DDT en parathion op do eiproduktie van der colaradokever (Leptinotarsa decemlineata Say). Meded. Landbouwhogesch, Opzockinsstn. Staat. Gent. 27, 908-919.
- 781. Kulkarni, P. G., Mitlin, N., and Hurst, G. A. 1973. Toxicity of busulfan and influence of ingested chemosterilized boll weevils on reproductive performance of the Japanese quall J. Econ. Entomol. 66: 341-348.
- Kung, K. S. 1967. Effect of the chemosterilant metepa on the housefly, *Musca domestica L. Ph. D. Thesis*, University of Florida, Gainesville.
- 783 , and LaBrecque, G C. 1971. The effect of metepa on the sterility, mortality and longevity of houseflies, Musca domestica L. J. Med. Entomol. 8: 45–47.
- 784 Kunz, S. E., and Eschle, J. L. 1971. Possible use of the sterile-male technique for eradication of the horn fly. In Symp. Steril. Princ. Insect Control Erad. Proc. IAEA Proc. Ser. STI/PUB/265, pp. 145-156.
- 785. Kuppuswamy, N. T., Jayaraj, S., and Subramaman, T. R. 1971. Sterility-inducing effects of some antibiotics and sulfanilamides on the legume aphid *Aphis craccivora*. Madras Agric. J. 58: 488-494.
- 786. Kuzm, A. N., Kolomijtseva, I. K, and Yusitov, N. I. 1968. Effect of ecdysone on the puparium formation in irradiated Ephestia kuhniella Z. Nature (Lond.) 217: 743-744.
- Kwasnik, H. R., Oliver, J. E., and Brown, R. T. 1972.
   2,5-Diarylimidazo(4,5-d)imidazoles. J. Heterocycl. Chem. 9, 1429-1431.

#### ${f L}$

- LaBrecque, G. C. 1961. Chemical sterilants debut in insect control. Chem. Week 88(11); 95–99.
- 1961. Studies with three alkylating agents as housefly sterilants. J. Econ. Entomol. 54: 684-689.
- 1963. Chemosterilants for the control of houseflies. Adv. Chem. Ser. 41: 42-46.
- 791. ——. 1964. Chemosterilants for the control of insects.
   Proc. XII Int. Congr. Entomol., July 8-16, London,
   1964, pp. 515-516.
- 792. --- 1965. Applications of chemosterilants. 150th

- Meet. Amer Chem Soc., Sept 12-17. Abstracts of papers, p 30A
- 793. \_\_\_\_\_. 1965 Status of chemosterilization, IAEA Tech.
  Ren. Ser. 44, 46 pp.
- 794. ———. 1967. An autosterilization technique for the housefly, Musca domestica L. 6th Meet. Entomol. Soc. Mex., Mexico City, Mex., 1967, pp. 23-26.
- 795. ————. 1971 Principles of the sterile male technique as applied to insect control. International Symposium on the Use of Isotopes and Radiation in Agricultural and Animal Research, Indian Council of Agricultural Research New Delhi, (Nov. 30-Dec. 2, 1971)
- Adcock, P. H., and Smith, C. N. 1960. Tests with compounds affecting housefly metabolism. J. Econ. Entomol 53: 802–805
- 798. ——, Bowman, M. C., Patterson, R. S., and Seawright, J. A. 1972. Persistence of thiotepa and tepa in pupae and adults of Culex pipiens fatigans Wiedemann. Bull WHO 47: 675-676
- 799. ——, Fye, R. L., DeMdo, A. B., and Borkovec, A. B. 1968. Substituted melamines as chemosterilants of houseflies. J Econ. Entomol. 61: 1621–1632.
- 800. Fye, R. L., and Morgan, J., Jr. 1972. Induction of sterility in adult houseflies and stable flies by chemosterilization of pupae J Econ. Entomol. 65: 751-753.
- and Gouck, H. K 1963. Compounds affecting fertility in adult houseflies. J. Econ. Entomol. 56: 476.
- and Keller, J. C 1964. Advances in insect population control by the sterile-male technique. Tech Rep. Ser. 44 IAEA, 79 pp.
- 803. ——, and Meifert, D. W. 1966. Control of houseflies (Diptera: Muscidae) in poultry houses with chemosterilants. J. Med. Entomol. 3: 328-326.
- 804. ——, and Meifert, D. W. 1970. Sterility in adult houseflies exposed to residual deposits of chemicals. J. Econ. Entomol 63: 1716-1717.
- Meifert, D. W., and Fye, R. L. 1963. A field study on the control of houseflies with chemosterilant techniques. J. Econ. Entomol. 56: 150-152.
- 806. —, Meifert, D. W., and Gouck, H. K. 1963. Effectiveness of three 2-methyl-azirdine derivatives as housefly chemosterilants. Fla. Entomol. 46: 7–10.
- Morgan, P. B., Meifert, D. W., and Fye, R. L. 1965. Effectiveness of hempa as a housefly chemosterilant. J. Med. Entomol. 3; 40–43.
- 808. ——, Smith, C. N., and Meifert, D. W. 1961. A field experiment in the control of houseflies with chemosterilant baits. J. Econ. Entomol. 55: 449-451.
- Smith, C. N., and Meifert, D. W. 1962. Mating competitiveness of chemosterilized and normal male houseflies. Science 136: 388-389.
- and Weidhaas, D. E. 1970. Advantages of integrating sterile-male releases with other methods of control against houseflies. J. Econ. Entomol. 63: 379-382.
- LaChance, L. E. 1966. The induction of dominant lethal mutations and sperm inactivation by chemical mutagens in *Habrobracon*, (Abstr.) Genetics 54: 345.
- 812. , 1967. The induction of dominant lethal mutations in insects by ionizing radiation and chemicals—as re-

- lated to the sterile-male technique of insect control. In J Wright and R Pal (eds.), Genetics of Insect Vectors of Disease, pp. 617-650. Elsevier Press, Amsterdam.
- 813. ———, and Crystal, M. M. 1963. The modification of reproduction monsects treated with alkylating agents. II. Differential sensitivity of occyte meiotic stages to the induction of dominant lethals. Biol. Bull. 125: 280–288.
- 814. ——, and Crystal, M. M. 1965 Induction of dominant lethal mutations in msect occytes and sperm by gamma rays and an alkylating agent: Dose-response and joint action studies. Genetics 51: 699-708.
- 816 , Degrugillier, M., and Leverich, A. P. 1969. Comparative effects of chemosterilants on spermatogenic stages in the housefly. I. Induction of dominant lethal mutations in mature sperm and gonial cell death. Mutat. Res. 7: 63-74.
- 816. , Degrugilher, M., and Leverich, A. P. 1970. Comparative effects of chemosterilants on spermatogenic stages in the house fly. H. Recovery of fertility and sperm transfer in successive matings after sterilization with 1,3-propanediol dimethanesulfonate or X-rays. Ann. Entomol. Soc. Amer. 63: 422-428.
- 817. ——, and Knipling, E. F. 1962. Control of insect populations through genetic manipulations. Ann. Entomol. Soc. Amer. 56: 515–520.
- 818. ———, and Leopold, R. A. 1961. Cytogenetic effect of chemosterilants in housefly sperm: Incidence of polyspermy and expression of dominant lethal mutations in early cleavage nuclei. Can. J. Gen. Cytol. II: 648-669
- 819. ——, and Leverich, A. P. 1965. Cytogenetic studies on the effect of an alkylating agent on msect nurse cell polytene chromosomes as related to ovarian growth and fecundity. (Abstr.) Genetics 52: 453–454.
- 820. ——, and Leverich, A. P. 1968. Chemosterilant studies on Bracon (Hymenoptera: Braconidae) sperm. I.
   Sperm inactivation and dominant lethal mutations,
   Ann. Entomol. Soc. Amer. 61: 164–175.
- many and Leverich, A. P. 1968. Cytology of oogenesis in chemosterilized screwworm flies, Cochliomyia hominivorax as related to endomitosis in nurse cells.
   Ann. Entomol. Soc. Amer. 61; 1188-1197.
- 822. ——, and Leverich, A. P. 1969. Chemosterilant studies on *Bracon* sperm. II. Studies of selected compounds for induction of dominant lethal mutations or sperm inactivation. Ann. Entomol. Soc. Amer. 62: 790–796.
- 823. ——, North, D. T., and Klassen, W. 1968. Cytogenic and cellular basis of chemically induced sterility in insects. In G. C. LaBrecque and C. N. Smith (eds.), Principles of Insect Chemosterilization, pp. 99–157. North-Holland Publishing Co., Amsterdam.
- 824. ——, and Riemann, J. G. 1964. Cytogenetic investigations on radiation and chemically induced dominant lethal mutations in oocytes and sperm of the screwworm fly. Mutat. Res. 1: 318-338.
- 825. Ladd, T. L., Jr. 1966. Egg viability and longevity of Japanese beetles treated with tepa, apholate, and metepa, J. Econ. Entomol. 59; 422-425.
- 826. ———. 1968. Some effects of three triphenyltin compounds on the fertility and longevity of Japanese bootles. J. Econ. Entomol. 61: 577-578.
- 827. ———, 1968. The permanent and cumulative tepa-induced sterility in male Japanese b

- Econ Entomol 61 1058-1059.

- 830 Colher, C. W., and Plasket, E. I. 1968 Mass sterilization of Japanese beetles with tepa and the determination of residues. J. Econ. Entomol. 61; 912-944
- Lal, O. P. 1972. Sterility in black bean aphid through terramyon, likuden, and flavomyon. Curr. Sci. 41: 74-76
- 833 . 1972 Effect of certain antibiotics on the development and reproductivity of *Lipaphus erysimi* Kalt. on cabbage plant. Z. Angew. Entomol. 70: 82-87.
- 884 1972. Synergism of terramycin to inhibit the reproductivity of Aphis fabae Experientia 28: 717-718
- Lancaster, J. L., Jr., and Simco, J. S. 1969. Housefly control by chemical sterilization with apholate. Ark Agric Exp. Stn. Bull. 737, 12 pp
- 836. Landa, V , and Rezabova, B. 1964. The effect of chemosterilants on the development of reproductive organs in insects. Proc. XII Int. Congr. Entomol. London (July 8–16, 1964), pp. 516–517.
- 837 and Matolin, S. 1971 Effects of chemosterilants on reproductive organs and embryogenesis in insects.

  In Symp. Steril. Princ. Insect Control Erad. Proc. IAEA Proc. Ser. STI/PUB/265, pp. 173-182.
- 838 , and Rezabova, B. 1969. Use of chemosterilants for insect control and the research carried out in this area in the Czechoslovak Socialist Republic. Tagunsber. Deut. Akad. Landwirtschaftswiss. Berlin, No. 80 (Part 1) 101-104 [In German.]
- 839. Lang, J. T., and Treece, R E. 1971. Sterility and longevity effects of Sterenlia foetida oil on the face fly J. Econ. Entomol. 64: 455-457.
- 840. ——, and Treece, R. E. 1972. Boric acid on face fly fecundity. J. Econ. Entomol 65, 740-741.
- 841. Langenscheidt, M. 1973. On the mode of action of sterilants in *Tetranychus urticae* (Koch) (Acari, Tetranychidae). I. Development of the female genital organ and oogenesis in non treated spider mites. Z. Angew. Entomol. 73: 103-106.
- 842. ——. 1978. On the mode of action of sterilants in Tetranychus urticae (Koch) (Acari, Tetranychidae). II. Mode of action of apholate in spider mites. Z. Angew. Entomol. 74: 142-151
- 843. Largman, T., and Newallis, P. E. 1971. N-(3,4-Dichlorophenyl) 3 [N' (3,4 dichlorophenyl)carbamoyl] methyl-2,2-dimethylcyclobutanecarboxamide as a chemosterilant for insects, birds, and mammals. U.S. 3,629,459.
- Laven, H. 1967. Eradication of Culex pipiens fatigans through cytoplasmic incompatibility. Nature (Lond.) 216: 383.
- 845. ———, Cousserans, J., and Guille, G. 1971. Inherited semisterility for control of harmful insects. III. A first

- field experiment Experientia 27: 1355-1356.
- 846 Lawson, F. R 1967 Theory of control of insect populations by sexually sterile males. Ann Entomol Soc Amer 60, 713-722
- 847 Leasure, J. K., and Speier, J. L. 1966. Some herbicidal silicon compounds. J. Med. Chem. 9: 949-952.
- 848 LeBras, S. 1973 The action of a chemosterilant, thiourea, on adults of *Musca domestica*. Entomol. Exp. Appl. 16: 9-19.
- 849. Lee, W.-Y, Wang, Y-H., and Lin, F-J. 1967. The effects of apholate on oxygen consumption of the eggs of houseflies, Musca domestica L (Diptera, Muscidae). Bull. Inst. Zool. Acad. Sin 6: 87-91
- 850 Lemin, A. J., and Township, R. 1967. Insect chemosterilants 3-substituted 2-oxobutyraldehyde, bis-(thiosemicarbazones), their alkali metal salts, and their metal chelates U.S. Pat. 3,321,362.
- Leopold, R. A., and Swilley, E. 1968. Effects of alkylating and nonalkylating chemosterilants on housefly embryogenesis. Proc. North Cent. Branch Amer. Assoc. Econ. Entomol. 23: 30.
- Lesh, J. B., and Damaskus, C. W. 1966. Sterilizing insects with bis-ethylenimine phosphoracarbamate. U.S. Pat. 3,264,178.
- 853. Leverich, A. P., and LaChance, L. E. 1968. Cytological basis of sterility induced by alkylating and nonalkylating chemosterulants in houseflies. Proc. North Cent. Branch Amer. Assoc. Econ. Entomol. 32: 28.
- 854 Levinson, H. Z., and Cohen, E. 1973. Action of overdosed biotin on reproduction of the hide beetle, *Dermestes* maculatus. J. Insect Physiol. 19: 551-558.
- 855 Lewallen, L. L., Chapman, H. C., and Wilder, W. H. 1965. Chemosterilant application to an isolated population of *Culex tarsalis*. Mosq. News 25: 16–18.
- Lewis, W. J., and Young, J. R. 1972. Parasitism by Trichogramma evanescens of eggs from tepasterilized and normal Heliothis zea. J. Econ. Entomol. 65: 705-708.
- 857. Lindquist, A. W. 1961. Chemicals to sterilize insects. J. Wash, Acad. Sci.: 109~114.
- 858. ——. 1961. New ways to control insects. Pest Control 29(6): 9, 11, 12, 14, 16, 18, 19, 36, 38, 40.
- Lindquist, D. A., and House, V. S. 1967. Mating studies with apholate-sterilized boll weevils. J. Econ. Entomol. 60: 468-473.
- Gorzycki, L. J., Mayer, M. S., Scales, A. L., and Davich, T. B. 1964. Laboratory studies on sterilization of the boll weevil with apholate. J. Econ. Entomol. 57: 745–750.
- 861. Linkfield, R. L. 1966. Biological observations on the Oriental rat flea, *Xenopsylla cheopis* (Rothschild), with special studies on the effects of the chemosterilant trus-(1-aziridinyl)phosphine oxide. Ph. D. Thesis, University of Florida, Gainesville.
- Loaeza, R. M., and Corona, A. O. 1965. Esternlization de la Musca domestica con apholate. Folia Entomol. Mex. 10: 3-15.
- 863. Lobbecke, E. A., and von Borstel, R. C. 1962. Mutational response of *Habrobracon* oocytes in metaphase and prophase to ethyl methanesulfonate and nitrogen mustard. Genetics 47: 858-864.
- 864. Lofgren, C. S., Boston, M. D., and Borkovec, A. B. 1973.
  Aziridinylphosphine oxides and sulfides as chemosterilants in male pupae of Anopheles albimanus

- Wiedemann Mosq. News 33: 187-189.
- 865. ——, Dame, D. A., Breeland, S. G., Weidhaas, D. E., Jeffery, G., Kaiser, R., Ford, H. R., Boston, M. D., and Baldwin, K. F. 1974. Release of chemosterilized males for the control of *Anopheles athimanus* in El Salvador III. Field methods and population control. Amer. J. Trop. Med. Hyg. 23: 288–297.
- Loveless, A. 1951. Qualitative aspects of the chemistry and biology of radiomimetric (mutagenic) substances Nature (Lond.) 167: 338-342.
- 1966. Genetic and allied effects of alkylating agents. 270 pp. Pennsylvania State University Press, University Park.
- 868 Luckmann, W. H., Gangrade, G., and Broersma, D. B. 1967. Inducing sterility in the onion maggot J. Econ. Entomol. 60: 787-741
- 869 Lukasiewicz, A. 1967. Reactions of trihalogenoacetic acids. V. Preparation of water-soluble derivatives of alpha-(trihalogenomethyl)amines Tetrahedron 23: 1713-1721
- 870. Lukefahr, M. J. 1970. Research being conducted on Heliothis spp. at Southwestern Cotton Insects Research Laboratory, Brownsville, Texas. Proc. Int. At. Agency Comm. Gov. Colomb., Bogota, Colombia (May 18-21), pp. 17-31.
- Lutz-Ostertag, Y., and Kantelip, J. P. 1972. Sterilizing action of endosulfan (Thiodan) (organo-chlorinated insecticide) on the gonads of chick and quail embryos, in vivo and in vitro. C. R. Seances Soc. Biol. Fil. 165: 844-848.
- Lyon, R. L. 1967. Chemosterilants to control bark beetles; tepa shows promise in preliminary test. U.S. For. Serv. Res. Pap. PSW-139, 5 pp.

#### M

- 873. McCray, E. M., Jr., and Schoof, H. F. 1967. Mist application of chemosterilants to adult male *Culex pipiens quinquefasciatus*. J. Econ. Entomol. 60: 60-63.
- 874. ——, and Schoof, H. F. 1970. Laboratory behavior of Culex pipiens quinquefasciatus and the effects of tepa, metepa, and apholate upon its reproduction.

  Mosq. News 30: 149-155.
- 875. McDuffie, W. C., and Weidhaus, D. E. 1965. The future outlook for new and improved materials and methods for mosquito control. Mosq. News 25: 85-91.
- McFadden, M. W. 1969. Transfer of chemosterilant by tepa-sterilized Mexican fruit flies. J. Econ. Entomol. 62: 511-512.
- 877. ——, and Rubio, R. E. P. 1965. Compounds affecting the reproductive capacity of the Mexican fruit fly. U.S. Dep. Agric. Res. Serv. [Rep.] No. ARS-33-108, 5 pp.
- 878. ——, and Rubio, R. E. P. 1966. Laboratory techniques for evaluating hempa and other chemosterilants against the Mexican fruit fly. J. Econ. Entomol. 59: 1400–1402.
- McGovern, W. L., Hardee, D. D., and Davich, T. B. 1969. Chemosterilants applied as sprays against populations of boll weevils on cotton in field cages. J. Econ. Entomol. 62; 1144-1147.
- 880. Macha, J. 1969. Fat body metabolism in *Pyrrhocoris* apterus during oogenesis and after sterilization with 6-azauridine. Acta. Entomol. Bohemoslov. 66: 193-197.

- 881. McHaffey, D. G. 1970. Boll weevil chemosterilants. Bull South Res. Inst. 23(1), 3-7.
- 882. ——, Flint, H. M., Haynes, J. W., Klassen, W., Mıtlin, N., and Davich, T. B. 1972. Sterility induced in bolt weevils by alkylating agents administered in an adult diet. J. Econ. Entonol. 65: 13-19.
- 883. Machemer, L., and Hess, R. 1971. Comparative dominant lethal studies with phenylbutazone, thio-tepa, and methyl methanesulfonate (MMS) in the mouse. Experientia 27: 1050-1052.
- McLaughhn, J. R., and Simpson, R. G. 1968 Chemosterilant effects of tepa, apholate, and metepa on the alfalfa weevil. J. Econ. Entomol 61: 1730-1733.
- 885. Madhukar, B. V. R., Pillai, M. K. K., and Borkovec, A. B. 1971. Chemosterilization of the yellow-fever mosquito. 1. Laboratory evaluation of aziridinyl compounds by larval and pupal treatments. J. Econ. Entomol. 64: 1024-1027.
- Pillai, M. K. K., Agarwal, H. C., and Shah, V. C.
   1970. Incorporation of thymidine into DNA of the gonads in the normal and chemosterilized yellow-fever mosquito. Entomol. Exp. Appl. 13: 275-278.
- 887. ——, Pillai, M. K. K., and Borkovee, A. B. 1971.

  Chemosterilization of the yellow-fever mosquito. 2.

  Laboratory evaluation of phosphoramides by larval and pupal treatments. J. Econ. Entomol. 64: 1027-1030.
- Madlafousek, J., Hlinak, Z., and Parizek, J. 1971. Sexual behaviour of male rats sterilized by cadmium. J. Reprod. Fert. 26: 189-196.
- Maehashi, H. 1970. Toxicity of chemosterilants. I. Toxicity of alkylating agent "Metepa" to rats and mice. Ind. Health 8(1/2): 54–65.
- Maes, J. P., and Magerat, A. 1972. Reproduction of the sparrow hawk (Accipiter nisus) in the south of Belgium. Aves 8: 158-166.
- 891. Magaudda, P. L., Sacca, G., and Guarniera, D. 1969. Sterile male method integrated by insecticides for the control of *Musca domestica* in the island of Vulcano, Italy. Ann. Ist. Super. Sanita 5(1/2): 29.
- Mahler, H. R., and Baylor, M. B. 1967. Effects of steroidal diamines on DNA duplication and mutagenesis. Proc. Natl. Acad. Sci. U.S.A. 58; 256–263.
- 893. Maitlen, J. C., and McDonough, L. M. 1967. Residues of tepa on chemosterilized codling moths. J. Econ. Entomol. 60: 1391–1393.
- 894. Malawista, S. E., Sato, H., and Bensch, K. G. 1968. Vinblastine and griseofulvin reversibly disrupt the living mitotic spindle. Science 160: 770-772.
- 895. Malik, M. M. 1970. The reproductive potential and certain behavioural aspects in some radio- or chemosterilized stored grain insects. Ph. D. thesis, University of London.
- 896. Maller, R. K., and Heidelberger, C. 1957. Studies on OPSPA. IV. Metabolsim of OPSPA in the rat and human, Cancer Res. 17: 296-301.
- Mandel, H. G. 1959. The physiological disposition of some anticancer agents. Pharmacol. Rev. 11: 743–838.
- 898. Manna, G. K., and Das, P. K. 1973. Effect of two chemosterilants apholate and hempa on the bone-marrow chromosomes of mice. Can. J. Genet. Cytol. 15: 451-459.
- 899. Marley, P. B. 1972. Effects of prostaglandins  $F_{2n}$ ,  $E_2$  and  $E_1$  on fertility in mice. Nature (Lond.) New Biol,

- 900 Marsh, R. E. 1970 Theory and potential value of rodent chemosterilants. WHO/VBC/70 176, 4 pp.
- 902. ——, and Howard, W. E. 1969. Evaluation of mestranol as a reproductive mhibitor of Norway rats in garbage dumps. J. Wildl. Manage. 33: 133-138
- 903 —, and Howard, W. E. 1970. Chemosterilants as an approach to rodent control. Proceedings of the 4th Vertebrate Pest Conference, West Sacramento, Calif (Mar. 3-5, 1970), pp. 55-63.
- 901 ——, and Howard, W. E. 1973. Prospects of chemosternlant and genetic control of rodents. Bull WHO 48: 309-316.
- Martin, A. O. 1965. Studies on the rate of spermatogenesis in *Drosophila*. Effects of X-rays and streptomyrin.
   Z. Indukt. Abstamm Vererbungsl. 96 28-35.
- 906. Martin, G. J., and Beiler, J. M. 1952. Effect of phosphorylated hesperidin, a hydromidase inhibitor, on fertility in the rat. Science 115, 402.
- Martirosyants, V I 1965. Effect of chemical sterilants on the internal state of insects Mater. Nauchn. Konf.

- control J. Econ. Entomol, 58: 291-292
- 920. Matolin, S. 1969. The effect of chemosterilants on the embryonic development of Musca domestica L. (Dip tera, Muscidae). Acta Entomol. Bohemoslov 66: 65-69
- 921. ——. 1970 Effects of a juvenile hormone analogue on embryogenesis in *Pyrrhocoris apterus* L. Acta Entomol. Bohemosloy, 67; 9-12.
- 922. ——, and Landa, V. 1971. The effect of furyltriazine on oogenesis and embryogenesis in *Musca domestica* L. Acta Entomol. Bohemoslov. 68: 1-5.
- 923. Matsumura, F , and Knight, S. G. 1967. Toxicity and chemosterilizing activity of aflotoxin against insects. J. Econ. Entomol. 60: 871-872
- 924. Matsuzawa, H, and Fuji'i, Y. 1968. On the sterilizing effect of hempa on the common housefly Musca domestica vicina (II), a field test in Sei Island. Jap. J. Sant Zool. 19. 210–212.
- 925. Mehrotra, K. N., and Sethi, G. R. 1966. Advances in insect population control by the sterile-male technique. J. Sci. Ind. Res. 25(12): 539-543.
- 926. Meifert, D. W., Fye, R. L., and LaBrecque, G. C. 1963. Effect on houseflies of exposure to residual applica-

- Trogoderma granarium Everts, Acta Entomol Bohemoslov, 69: 229-242,
- 939 ——, Sehnal, F, and Landa, V 1972. Reduction of fecundity and control of the khapra beetle by juvenile hormone mimics. J. Econ Entomol 65: 1608-1605.
- 940. Millar, E. S. 1965. Chemical sterilisation of the green sheep blowfly, *Lucilia sericata* Meigen, with "apholate." N.Z. J. Agric. Res. 8, 295-301
- 941 Miller, R. W., and Uebel, E. C. 1974 Juvenile hormone mimics as feed additives for control of the face fly and housefly. J. Econ. Entomol. 67: 69–70
- 942 Miller, S., and Perry, A. S. 1965. Isolation, purification and characterization of N<sup>5</sup>-formyltetrahydrofolic acid (folinic acid) from the housefly. Life Sci. 4: 1573–1580.
- 943. Mitlin, N. 1956. Inhibition of development in the housefly by 3,4-methylenedioxyphenyl compounds J. Econ Entomol. 49: 683-684.
- 944. ———. 1964. The physiology and toxicology of chemosterilants. Proc. XII Int. Congr. Entomol., London (July 8-16, 1964), pp. 511-513.
- 945. ——, and Baroody, A. M. 1958. The effect of some biologically active compounds on growth of housefly ovaries. J. Econ. Entomol. 51; 384–385.
- 946. —— and Baroody, A. M. 1958. Use of the housefly as a screening agent for tumor-inhibiting agents. Cancer Res. 18; 708–710.
- 947. ——, Butt, B. A., and Shortino, T. J. 1957. Effect of mitotic poisons on housefly oviposition Physiol. Zool. 30: 133-136.
- 948. ——, and Konecky, M. S. 1955. The mhibition of development in the housefly by piperonyl butoxide. J. Econ. Entomol. 48: 93-94.
- 949. ———, Konecky, M. S., and Piquett, P. G. 1954. The effect of a folic acid antagonist on the housefly J Econ. Entomol. 47: 932-933.
- 950. Mittler, S., and Arnesen, J. F. 1966. Effect of urethane and colchicine on radiation-induced chromosome loss in male *Drosophila*. Int. J. Radiat. Biol. 11: 161-170
- 951. Mohiuddin, S., and Qureshi, S. A. 1973. Chemosterilization of the laboratory-reared yellow-fever mosquito, *Aedes aegypti* (L.) by substituted phosphine oxides and methylmelamines. Pak. J. Sci. Ind. Res. 16(1/2): 59-62.
- 952. ——, and Qureshi, S. A. 1973. Screening tests of substituted phosphine oxides, phosphonic amides, methylmelamines, and diaminotriazines for sterilization of laboratory-reared strain of houseflies, *Musca domestica*. Pak. J. Sci. Ind. Res. 16(5): 182–187.
- 953. ——, Qureshi, S. A., and Roomi, M. W. 1970. Effects of thiourea on the housefly, *Musca domestica* (L.) (Dipt., Muscid.), Z. Angew. Entomol. 66: 435.
- 954. Monro, J. 1963. Population control in animals by overloading resources with sterile animals. Science 140: 496.
- 1966. Population flushing with sexually sterile insects. Science 151: 1536-1538.
- 956. Monroe, R. E., Robbins, W. E., Chambers, D. L., and Tabor, L. A. 1963. Sterol antagonists and housefly reproduction. Ann. Entomol. Soc. Amer. 56: 124-125.
- 957. Montgomery, J. A. 1959. The relation of anticancer activity to chemical structure. A review. Cancer Res. 19: 447–463.
- 958. Moore, R. F., and Taft, H. M. 1969. Effect of melatonin on egg production of the boll weevil, Anthonomus grandis. Ann. Entomol. Soc. Amer. 62: 252.

- 959. Moorhouse, J. E., Yeadon, R., Beevor, P. S., and Nesbitt, B. F. 1969. Method for use in studies of insect chemical communication. Nature (Lond.) 223–1174-1175.
- 960 Morgan, P. B. 1965 Cytological effects of chemosterilants on housefly ovaries. 150th Meet. Amer. Chem. Soc. (Sept. 12–17, 1965). Abstracts of papers, p. 27A.
- 961. ———— 1967. Booby-trapped female houseflies as sterilant carriers, J. Econ. Entomol. 60, 612-613
- 962. ———— 1967. Effects of hempa on the ovarian development of the honsefly, Musca domestica (Diptera Muscidae) Ann Entomol Soc Amer 60, 812.
- 963. ———. 1967. Inhibition of 5-fluoroototic acid on the ovarian development of houseflies, Musca domestica, Ann. Entomol. Soc. Amer. 60: 1158–1161.
- 964 ———. 1978. Houseflies, Effect of apholate and its failure to induce resistance J Econ. Entomol. 66, 609-611.
- Bowman, M. C , and LaBreeque, G. C. 1968.
   Uptake and persistence of metepa and hempa in the housefly. J. Econ. Entomol. 61: 805-808.
- 966. ——, and LaBrecque, G. C. 1962. The effect of apholate on the ovarian development of houseflies. J. Econ. Entomol. 55, 626-628.
- 967. ———, and LaBrecque, G. C. 1964. Effect of tepa and metepa on ovarian development of houseflies. J. Econ. Entomol. 57: 896–899.
- 968. ——, and LaBrecque, G. C. 1964. Studies of the effect of meat exposed to gamma radiation or chemosterilants on the reproductive capacity of a blow fly *Phaenicia* cuprina (Wiedemann). Fla. Entomol. 47: 31-33.
- 969. ——, and LaBrecque, G. C. 1971. Hormones or hormonelike substances and the development and fertility of houseflies. J. Econ. Entomol. 64: 1479–1481.
- 970. ——, LaBrecque, G. C., Smith, C. N., Meifert, D. W., and Murvosh, C. M. 1967. Cumulative effects of substerilizing dosages of apholate and metepa on laboratory populations of the housefly. J. Econ. Entomol. 60, 1064-1067
- 971 Morrarty, F 1969 The sublethal effects of synthetic msecticides on insects Biol. Rev. 44: 321–357.
- 972 Morlan, H. B., McCray, E. M., Jr., and Kilpatrick, J. W. 1962. Field tests with sexually sterile males for control of Acdes aegypti. Mosq. News 22: 295.
- 973. Morris, J. M., and vanWagenen, G. 1966. Compounds interfering with ovum implantation and development. III. The role of estrogens. Amer. J. Obstet. Gynecol. 96: 804–813
- 974. ———, vanWagenen, G., Hurteau, G. D., Johnson, D. W., and Carolsen, R. A. 1967. Compounds interfering with ovum implantation and development. I. Alkaloids and antimetabolites. Fertil. Steril. 18: 7–17.
- vanWagenen, G., McCann, T., and Jacob, D.
   1967. Compounds interfering with ovum implantation and development. II Synthetic estrogens and anti-estrogens. Fertil. Steril. 18: 17-34.
- 976. Mouchet, J., and Rageau, J. 1963. La sterilisation sexuelle et l'autodestruction de l'espece dans la lutte contre les msectes. Maroc Med. 457-42-63: 474-487.
- 977. Mourikis, P. A., and Fytizas, E. 1970. Review of olive-fly ecology in relation to the sterile-male technique. Proc. Panel Sterile-Male Tech. Control Fruit Flies, Vienna, 1970, pp. 131–139.
- 978. Mueller, H. P. 1971. The autocidal method and its chances for controlling the cabbage magget, Phorbia brassicae

- Bouche Z. Angew Entomol 67 125-133.
- 979. Mukherjee, M. C. 1961. Sterility in *Drosophila* metanogaster consequent on using a mammahan oral contraceptive, Sci. Cult. 27, 497-498.
- 980. Mulla, M. S. 1964. Chemosterilization of the mosquito Culex p. quinquetascuius. Mosq. News 24: 212-217
- 1965 Biology and control of Hippelates eye gnats
  Proc. Calif. Mosq. Control. Assoc., 33rd Annu. Conf.,
  pp. 26-28

- 984. Murdie, G, and Campion, D. G. 1972. Computer simulation of red bollworm populations in control programmes using sterile males and sex attractants. Cotton Grow. Rev. 49, 276-284.
- 985. Murphy, M. L., and Karnofsky, D. A. 1956. Effect of azascrine and other growth inhibiting agents on fetal development of the rat. Cancer 9: 954-962.
- Murray, W. S., and Bickley, W. E. 1964. Effect of apholate on the southern house mosquito Culer pipiens
  quinquefasciatus Say. Univ. Md., Agrie Exp. Stn.
  Bull. A-134, 37 pp.
- 987. Murvosh, C. M., LaBreeque, G. C, and Smith, C. N. 1964 Effect of three chemosterilants of housefly longevity and sterility. J. Econ Entomol, 57: 89-93.
- 988. Musharraf, A. A., and Khan, N. H. 1971. The effect of hempa on the sterility and longevity of normal and DDT resistant strains of Musca domestica nebulo Fabr. Botyu-Kagaku 36: 37-40.
- 989. Mustafa, M., and Naidu, M. B. 1964. Chemical sterilization of *Dysdercus congulatus* F. (Red cotton bug). Indian J. Exp. Biol. 2: 55-56

#### N

- 990. Nadkarni, M. V., Trains, E. G., and Smith, P. K. 1959. Preliminary studies on the distribution and fate of TEM, tepa, and myleran in the human Cancer Res. 19: 713-718.
- 991. Nagasawa, S., and Shinohara, H. 1964. Sterihzing effect of metepa on the Azuki bean weevil, Callosobruchus chinensis L., with special reference to the hatching of the eggs deposited by treated weevils. Jap. J. Appl Entomol. Zool. 8: 123-128.
- 992. ——, and Shinohara, H 1964. Sterilizing effect of apholate on the Azuki bean weevil, Callosobruchus chiaensis L., with special reference to the hatching of the eggs deposited by treated weevils. Jap. J. Appl. Entomol. Zool. 8: 272-276
- 993. ——, and Shmohara, H 1965. Joint sterilizing effect of a mixture of apholate and metepa on the Azuki bean weevil, Callosobruchus chinensis L., with special reference to the hatchability of eggs deposited by treated weevils. Jap. J. Appl. Entomol. Zool. 9: 162-165.
- 994. ——, and Shinohara, H. 1965. Mating competition between apholate-sterilized and normal males of the Azuki bean weevil, Callosobruchus chinensis L. Jap. J. Appl. Entomol. Zool. 9: 271–274.
- 995. ——, and Shinohara, H. 1967, Joint sterilizing effect of a mixture of apholate and hempa on the Azuki bean

- weevil, Callosobruchus chinensis L. Botyu-Kagaku 32 39-43
- 996 ———, Shinohara, H., and Shiba, M. 1965. Sterilizing effect of Dowco-186 on the Azuki bean weevil, Callosobruchus chinensis L., with special reference to the hatchability of the eggs deposited by treated weevils. Studies on the chemosterilants of insects. IV, Botyu-Kagaku 30: 91–95.
- 997. ———, Shinohara, H. and Shiba, M. 1966. Differential susceptibilities in sexes of the Azuki bean weevil, Callosobruchus chinensis. L., to the sterilizing effect of hempa. Studies on the chemosterilants of insects. IX. Botyu-Kagaku 31, 108-113.
- 998. ——, Shmohara, H., and Shiba, M. 1967 Differential susceptibilities in sexes of Callosobruchus chinensis L (Coleoptera, Bruchidae) to the sterilizing effects of triphenyltin hydroxide. J. Stored Prod Res. 3-177-184.
- 999. ——, and Nakayama, I. 1968 Joint sterilizing effect of a mixture of hempa and thiohempa, and of hempa and N,N,N',N'-tetramethyl-p-morpholinophosphmic diamide on the Azuki bean weevil, Callosobruchus chinensis L. Studies on the chemosterilants of insects XIII. Jap. J. Appl. Entomol. Zool. 12; 194-201.
- 1000. ——, and Nakayama, I. 1968. Presumption of dosageresponse curve obtained by the treatment of chemosterilant for both sexes of the Azuki bean weevil, Callosobruchus chinensis L. Studies on the chemosterilants of insects. XIV Botyu-Kagaku 33-146-152.
- 1001 ——, and Nakayama, I. 1972. Comparison of rates of emergence of offsprings in *Drosophila melanogaster* Meigen given hempa with saccharose and that with dried milk. Studies on the chemosterilants of insects. XVI. Jap. J. Appl. Entomol. Zool. 7, 1–8,
- 1002. Nakayama, I., and Nagasawa, S. 1966. Histopathological observation of chemosterilizing effect of metepa on male adults of the Azuki bean weevil, Callosobruchus chinensis L. Studies on the chemosterilants of insects. XII, Jap. J. Appl. Entomol. Zool. 10: 192-196
- 1003. ——, Kitagaki, T., and Kojima, K. 1971. Effects of two chemosterilants, metepa and hempa, on the hemolymph proteins in the last instar larvae and pupae of the smaller citrus dog, *Papilio ruthus* Linne. Botyu-Kagaku 36: 105-110.
- 1004. ——, Nagasawa, S., and Shimizu, H. 1969. Sterilizing effect of hempa on *Drosophila melanogaster* Meigen. Studies on the chemosterilants of insects. XV. Botyu-Kagaku 34: 6–12.
- 1005. Naqvi, S. N. H., Ashrafi, S. H., and Rasheed, S. 1978. Preliminary screening of miscellaneous compounds for their antifertility effects on Aedes aegypti (L.). Z. Angew Entomol. 73: 107.
- 1006. ——, Rasheed, S., Ahmed, I., and Ashrafi, S. H. 1974. Potentiality of n-valeramide and malonamide as prospective chemosterilant. Z. Angew. Entomol. 75: 301–307.
- 1007. Nassar, S. G., Staal, G. B., and Armanious, N. I. 1973. Effects and control potential of insect growth regulators with juvenile hormone activity on the greenbug. J. Econ. Entomol. 66: 847–850.
- 1008. Nayar, J. K. 1963. Effects of synthetic "queen substance" (9-oxodec-trans-2-enoic acid) on ovary development in the housefly, Musca domestica L. Nature (Lond.) 197:

- 1009 Nelson, N. M., and Evans, H. M. 1948 Effect of desoxypyridoxine on reproduction in the rat. Proc. Soc Exp. Biol. 68: 274.
- 1010. ——, and Evans, H M 1949. Pteroylglutamic acid and reproduction in the rat. J. Nutr 38, 11-24.
- 1011. Nelson, W. O., and Stemberger, E. 1952. The effect of fundroxyl upon reproduction in the female rat. Anat. Rec. 112: 426.
- Nematollahi, J., Guess, W., and Autian, J. 1966. Imidazolecarboxhydrazides. I. Chemistry and biological evaluation. J. Med. Chem. 9: 662-664.
- 1013. Nepoklonov, A. A., Veselkin, G. A., Grechkin, N. P., and Nuretdinov, I. A. 1971. Sterilizing action of some organophosphorus compounds on flies. Tr. Vses. Nauchno Isslied. 39(29): 3-311. [In Russian.]
- 1014. Newton, D. W., and Hays, R. L. 1968. Histological studies of ovaries in rats treated with hydroxyurea, triphenyltin acetate, and triphenyltin chloride. J Econ. Entomol. 61: 1668-1669.
- 1015. North, D. T. 1967. Sperm storage. Modification of recovered dominant lethal mutations induced by tretamine and analogs. Mutat, Res. 4: 225–228.
- 1016. Novak, V., Landa, V., and Rezabova, B. 1968. The possibility of application of chemosterilants in the control of some forest pests. [Abstr.] 13th Int. Congr. Entomol., Moscow, 1968, p. 184.

#### 0

- 1017. Odintsov, V. S. 1965. Only insecticides, no, also chemosterilants (for control of insects and ticks). Priroda 12: 72-75. [In Russian.]
- 1018. Ogata, K., and Tanaka, I. 1967. Notes on the mating competitiveness of hempa-treated and normal male houseflies. Jap. J. Samt. Zool. 18; 32.
- 1019. ——, Tanaka, I., and Suzuki, T. 1966. Observations on the chemosterilization of two alkylating agents, metepa and hempa on houseflies. Jap. J. Sanut. Zool. 17: 201.
- Oliver, J. E. 1971. The reaction of dithiazolium cations with sodium azide. J. Org. Chem. 36: 3465-3467.
- 1021. ——, Bierl, B. A., and Ruth, J. M. 1972. The reactions of some dithiazolium cations with potassium cyanate. J. Org. Chem. 37: 131–133.
- 1022. ——, Brown, R. T., Fye, R. L., and Borkovec, A. B. 1973. Insect chemosterilants. 1,2,4-dithiazolium salts and related compounds as additives to housefly diet. J. Agric. Food Chem. 21: 753-755.
- 1023. ——, Brown, R. T., and Redfearn, N. L. 1972. 5-(Dialkylamino)-1,2,4-dithiazole-3-thiones and 3,5-disubstituted-1,2,4-disthiazolium salts. J. Heterocycl. Chem. 9: 447-449.
- Brown, R. T., Stokes, J. B., and McHaffey, D. G.
   Chemosterilants against the boll weevil. 4. Miscellaneous compounds. J. Econ. Entomol. 66: 796-798.
- 1025. ——, Chang, S. C., Brown, R. T., and Borkovec, A. B. 1971. Insect chemosterilants. X. Substituted dithiobiurets. J. Med. Chem. 14; 772-773.
- 1026. ——, Chang, S. C., Brown, R. T., Stokes, J. B., and Borkovec, A. B. 1972. Insect chemosterilants. 11. Substituted 3, 5-diamino-1,2,4-dithiazolium salts and related compounds, J. Med. Chem. 15; 315-319.
- 1027. ——, and Crystal, M. M. 1972, Chemosterilants against screwworm flies. J. Econ. Entomol. 65: 303–306.

- 1028. ——, and DeMilo, A. B. 1971. Substituted 2,4,6,-tri-amino-1,3,5-thiadiazinium salts: A new hetero-aromatic system, J. Heterocycl. Chem. 8: 1087-1089.
- 1029 ——, Flippen, J. L., and Karle, J. 1972. X-ray crystal structure of 3,5-bis(thiocarbamoyl)-1,2,4-dithiazolidines. Chem. Commun., pp. 1153-1154.
- 1080. ——, and Sonnet, P. E. 1973. Improved route to methyl 4-methyl-imadazole-2-carboxylates and methyl 5-methyl-1,2,4-triazole-3-carboxylates. J. Org. Chem. 38: 1437.
- ——, and Stokes, J. B. 1970. Aminoadamantane derivatives as potential insect chemosterilants. J. Med. Chem. 13: 779.
- 1032. ——, and Stokes, J. B. 1970. The reaction of some amne salts of heterocyclic compounds with acetone. J. Heterocycl. Chem. 7: 961-965.
- 1033. ——, and Stokes, J. B. 1971. An attempted synthesis of 4,5-bis(dimethylamino)-1,2,3-thiadiazole. Can. J. Chem. 49, 2898–2902.
- 1034. ——, and Stokes, J. B. 1972. Air oxidation of 1,1,5,5-tetramethyl-dithiobiuret. J. Sulfur Chem. A,2: 105-108.
- 1085. Oliver, J. H., Jr., and Delfin, E. D. 1967. Gynandromorphism in *Dermacentor occidentalis* (Acari: Ixodidae). Ann. Entomol. Soc. Amer. 60: 1119-1121.
- 1036. Ondracek, J., and Matolin, S. 1971. Sterilizing effect of tepa on the bean beetle, Acanthoscelides obtectus Say (Coleoptera). Acta Entomol. Bohemoslov. 68: 209-215.
- 1037. Orphanidis, P. S. 1963. Recherches en laboratoire sur la sterilisation d'adults de *Ceratitis capitata* Wied, au moyen de substances sterilisantes. I. Experiences avec l'apholate. Ann, Inst. Phytopathol. Benaki 5(3): 260–287.
- 1038. ——. 1965. Sterilisation en laboratoire de Ceratitis capitata Wied, et de Dacus oleac Gmel, au moyen des azuridines, acaricides, fongicides et des sels mineraux.
   2d Congrès Internazional Antiparasitaires, Naples (Marz 15-17, 1965), 9 pp.
- 1039. ——. 1965. Preliminary report on a chemosterilization experiment on chemosterilization of adults *Dacus oleae* Gmel. in the field. Int. Symp. Crop Prot., 17th Symp. Ghent. Landbouwhogesch. Meded. 30: 1836-1845.
- 1040. ——, and Kalmoucos, P. E. 1971. Possibilites de lutte integree contre Dacus oleae (Gmelin) au moyen de methodes autocides et chimiques. In Symp. Steril. Princ. Insect Control Erad. Proc. IAEA Proc. Ser. STI/PUB/265, pp. 55-56.
- 1041. ——, and Patsacos, P. G. 1963. Recherches en laboratoire sur la sterilisation d'adults du Dacus oleae Gmel. au moyen de metaphoxide et d'apholate (Comparison avec les resultats obtenus sur Ceratitis capitata Wied.). Ann. Inst. Phytopathol, Benaki 5(4): 305-322.
- 1042. ——, Patsacos, P. G., and Kalmoucos, P. E. 1966. Experience preliminaire en plem champ sur la chimiosterilisation d'adults du *Dacus oleae* Gmel. Ann. Inst. Phytopathol. Benaki 7: 177-190.
- 1043. ——, and Patsacos, P. G. 1970. Chimiosterilisation des Dacus oleae (Gmel.) et Ceratuts capitata (Wied.) au moyen des substances chimiques avec ou sans pro prietes d'alkylation. Ann. Inst. Phytopathol. Ber New Ser. 9: 134-146.

- 1044 ——, Soultanopoulos, C. D., and Karandemos, M. G. 1963 Recherches en laboratone sur la sterilisation d'adultes de Ceratitis capitata Wied au moyen de substances sterilisantes II Experiences au moyen de metaphoxide, d'aphoxide et de chlorure de cuivre. Ann. Inst. Phytopathol. Benak. 5(4): 323-331
- 1045 Oster, I. I., and Pooley, E. 1960. A comparison of the mutagenic effects of monofunctional and polyfunctional alkylating agents. Rec. Genet. Soc. Amer. 29.
- 1045a ———, and Pooley, E. 1960. A comparison of the mutagenic effects of monofunctional and polyfunctional alkylating agents. Genetics 45, 1004–1605.
- 1046. Ottobom, A. 1972 Effect of DDT on the reproductive life-span in the female rat Toxicol Appl. Pharmacol 22 497-502.
- 1047. Ouellet, I., Corrivault, G. W., and Perron, J. M. 1970. Les substances neuroleptiques et le comportement des insectes. VIII. Effets de l'ether methylique d'epireserpate de methyle (Su-9064 CIBA) sur la fecondite de Drosophila melanogaster Meig. Can. J. Zool. 48, 997-1002.
- 1048 Outram, I., and Campion, D. G. 1967. Morphology of the male reproductive system and spermatophore of the red bollworm *Diparopsis castanea* (Hmps.) and the possible effect of the chemosterilant tepa on the gross structure. Ann. Appl. Biol. 60, 439–444.
- 1049 Ouye, M. T., and Graham, H. M. 1967. Study on eradication of a confined population of pink bollworms by release of males sterilized with metepa. J. Econ. Entomol. 60, 244–247.
- 1050 ——, Garcia, R. D., Guerra, A. A., and Lukefahr, M. J. 1969. Metepa as a chemosterilant for adult female pink bollworms. J. Econ. Entomol. 62: 650-652
- Garcia, R. D., and Martin, D. F. 1965. Sterilization of pink bollworm adults with metepa. J. Econ. Entomol. 58: 1018-1020.
- 1052. ——, Graham, H. M., Garcia, R. D., and Martin, D. F 1965. Comparative mating competitiveness of metepa-sterilized and normal pink bollworm males in laboratory and field cages. J Econ. Entomol 58: 927-929.

#### P

- 1053. Painter, R. R., and Kilgore, W. W. 1964. Temporary and permanent sterilization of houseflies with chemosterilants. J. Econ. Entomol. 57, 154-157
- 1054 ——, and Kilgore, W. W. 1965 Chemosterilant effect of 5-fluoroorotic acid on houseflies. J Econ Entomol. 58-888-891.
- 1055. ——, and Kilgore, W. W 1967 The effect of apholate and throtepa on nucleic acid synthesis and nucleotide ratios in housefly eggs. J. Insect Physiol. 13: 1105-1118.
- 1056. ——, Kilgore, W. W., and Gadallah, A. I. 1972. Influence of apholate on the haemolymph proteins of adult houseflies. J. Econ. Entomol. 65; 23-27.
- 1057. Pal, R., and LaBrecque, G. C. 1972. WHO/ICMR programme of genetic control of mosquitoes in India. XIV Int. Congr. Entomol., Canberra, Australia (Aug. 23-30, 1972).
- 1058. Palmquist, J., and LaChance, L. E. 1966. Comparative mutagenicity of two chemosterilants, tepa and hempa, in sperm of *Bracon hebetor*. Science 154: 915-917.

- 1059. Papanastassiou, Z. B., Brum, R. J., and White, E. 196: Potential caremolytic agents. VI. New deactivate biological alkylating agents. Experientia 24, 325.
- 1060 Papiyan, R. F. 1967 Effect of thio-TEPA on the life of bollworm butterflies. Mater. Sess. Zakavk. Sov. Koord Nauchn. Issled. Rab. Zashch. Rast. (Pul. 1968): 159-160. [In Russian.]
- 1061 Parish, J. C., and Arthur, B. W. 1965. Chemosterilizatio of housefiles fed certain ethylenimine derivatives J. Econ. Entomol. 58: 699-702.
- 1062 ——, and Arthur, B. W. 1965. Mammalian and insec metabolism of the chemosterilant thiotepa. J. Econ Entomol. 58: 976-979.
- 1063 Parnell, J. R., and Mettrick, D. F. 1969. The action u thiotepa on the fertility of the confused flour beetle J. Econ. Entomol. 62; 585-588
- 1061 Partington, M., Fox, B. W., and Jackson, H. 1964. Comparative action of some methane sulphonic exters of the cell population of the rat testis. Exp. Cell Res 33: 78-88.
- 1065. Patchin, S., and Davey, K. G. 1968 The effects of injected aminopterm on egg production in *Rhodnius prolivus* J. Insect. Physiol. 14: 1545-1551.
- 1066. Pate, B D, and Hays, R. L. 1968. Histological studies of testes in rats treated with certain insect chemosteril ants. J. Econ. Entomol. 61, 32-34.
- 1067 Paterson, A. R. P 1963 Biochemical mechanisms of resistance to antimetabolites. Can. Cancer Conf. 5 417–438.
- 1068 Patterson, J. W. Critical sensitivity of the ovary of Acdes aegypti adults to sterilization by juvenile hormone mimes. Nature (Lond.) New Biol. 233: 176-177.
- 1069. Patterson, N. A. 1965 Lead arsenate as an apple magget chemosterilant Can, Dep Agric. Res Farmers 10(1): 3,
- 1070. Patterson, R. S. 1971. The integrated use of the sterile male technique to control Culex fatigans. Proc. Semin. Genet Our Health, Indian Council of Medical Research, New Delhi (Apr. 5-8, 1971), pp. 126-128.
- 1071. ——, Boston, M. D., Ford, H. R., and Lofgren, C. S. 1971. Techniques for sterilizing large numbers of mosquitoes. Mosq. News 31: 85-90.
- 1072. ——, Boston, M. D., and Lofgren, C. S. 1972. Competitiveness of male *Culex pipiens quinquefasciatus* sterilized by tepa or apholate in field cages. Mosq. News 32: 95–98.
- 1073 ——, Boston, M. D, and Lofgren, C. S. 1972. Mating competitiveness of chemosterilized male southern house mosquitoes treated with tepa. Mosq. News 32: 230–233.
- 1074 , Ford, H. R., Lofgren, C. S., and Weidhaas, D. E. 1970. Sterile males: Their effect on an isolated population of mosquitoes. Mosq. News 30: 23-27.
- 1075. ——, and Lofgren, C. S. 1968. The potential use of sterile males to control Culex pipiens fatigans Wiedemann. Proc. N.J. Mosq. Exterm. Assoc., pp. 170-175.
- 1076. ——, Lofgren, C. S., and Boston, M. D. 1967. Resistance in Aedes aegypti to chemosterilants: Effect of apholate selection on resistance to apholate, tepa, and metepa. J. Econ. Entomol. 60: 1673-1675.
- 1077. , Lofgren, C. S., and Boston, M. D. 1968. The sterile-male technique for control of mosquitoes: A field cage study with Anopheles quadrimaculatus.

- Fla. Entomol, 51, 77-82.
- 1078. ——, Weidhaas, D. E., Ford, H. R., and Lofgren, C. S. 1970. Suppression and elimination of an island population of Culex pipiens quinquefasciatus with sterile males. Science 168; 1368-1370.
- 1079. Pausch, R. D. 1969 A laboratory evaluation of barts and chemosterilants on the little housefly J. Econ. Entomol 62: 25-28
- 1080. ———. 1971. Local housefly control with baited chemosterilants. I. Preliminary laboratory studies. J. Econ. Entomol 64: 1462-1465.
- 1081 Pelekassis, C. E. D., and Mourikis, P. A. 1963 Preliminary note on the chemical sterilization of the olive fruit fly. 5th FAO Meet. Ohve Pest Control, Lisbon (May 20–27, 1963)
- 1082. Pelerents, C, and Degheele, D 1967. L'action stérilisante du metepa et de l'apholate sur la teigne de la farine (Ephestia kuhniella Z.). Meded. Rijksfac. Landbouwwet. Gent. 32: 711-716.
- 1083. ——, and Goeteyn, R. 1969. Quelques effets de l'apholate sur la mouche du chou Delia brassicae Bouché. 3ème Congrès Internazional des Antiparasitaires, Milan (Oct. 6-8, 1969), pp. 363-370.
- 1084. Perje, A. Studies on the spermatogenesis in Musca domestica Hereditas 34: 209-232.
- 1085. Perrm-Walkdemar, C. 1969. Effets d'un antagoniste de l'acide folique sur le testicule adulte de *Drosophile* (insect Diptère). Modifications morphologiques et histopathologiques. C. R. Acad. Sci. 286: 165-168.
- 1086 Perry, A. S., and Miller, S. 1965. The essential role of folic acid and the effect of antimetabolites on growth and metamorphosis of housefly larvae Musca domestica L. J. Insect Physiol. 11: 1277-1287.
- 1087. Pershad, S. B., and Naidu, M. B. 1966. Sexual sterility induced in the housefly by contact exposure to chemosterilant apholate. J. Econ. Entomol. 59: 948-950.
- 1088. Persin, S. A. 1970. The effect of mineral fertilizers upon the fecundity of *Eurygaster integriceps* (Heteroptera, Scutelleridae). Zool. Zh. 49: 1580-1583.
- 1089. Persoons, C. J. 1969. Purine derivates and analogues as insect chemosterilants. Influence of 6-methylmercapto-3-deazapurine on reproduction of *Periplan*eta americana. 3ème Congrès Internazional des Antiparasitaires, Milan (Oct. 6-8, 1969), pp. 379-385.
- 1090. Petrukha, O. I., Bichuk, Yu. P., Protsenko, L. D., Skul'skaya, N. Ya., Kornev, K. A., and Khomenkova, K. K. 1969. Chemical induction of sterility in the common beet weevil. Khim. Sel'sk. Khoz. 7(10): 748-752. [In Russian.]
- Philips, F. S., Hamilton, L. D., Clarke, D. A., Sternberg,
   S. S., and Hitchings, G. H. 1952. Actions of 2,4-diamino-5-(3',4'-dichlorophenyl)-6-methyl pyrimidine in mammals. Cancer Res. 12: 287-288.
- 1092. ——, Sternberg, S. S., Hamilton, L. D., and Clarke, D. A. 1956, Effects of thioguanine in mammals. Cancer 9: 1092-1101,
- 1093. Pickett, A. D., and Patterson, N. A. 1963. Arsenates: Effect on fecundity in some Diptera. Science 140: 493-494.
- 1094. Pillai, M. K. K. 1970. Mosquito control through chemosterilization. Patna J Med. 44: 461-470.
- 1095. ——. 1972. Chemosterilants for mosquitoes. Pestic Chem. Proc. 2d Int. Congr. Pestic. Chem. 1: 488-493.
- 1096. and Agarwal, H. C. 1969, Effect of apholate and

- hempa on nucleic acid and protein synthesis in the yellow-fever mosquito (Acdes acgypti) (Dipt. Culicidae). Entomol. Exp. Appl. 12, 413–422.
- 1097 ——, and Grover, K. K. 1968. Sterilizing effect of a phosphoramide on Culex fatigans Weid Curr. Sci. 37: 257-258.
- 1098. ——, and Grover, K. K. 1969. Chemosterilization of Culex pipiens fatigans. Weidemann by exposure of aquatic stages. I Sterilization of certain aziridinyl compounds. Bull. WHO 41: 915-928.
- 1099 ———, and Grover, K. K. 1969. Duration of sterility induced in males of the tropical house mosquito, *Culex pipiens fatigans* Wiedemann, by the chemosterilants apholate and tepa Bull, WHO 40, 229–234.
- 1100. ——, and Madhukar, B. V. R. 1969. Effect of biotin on the fertility of the yellow-fever mosquito, *Aedes aegupti*. Naturwissenchaften 56: 218.
- 1101. Pino, J. A., and Hudson, C. B. 1953. Duration of sexual retardation in white leghorn pullets and cockerels following enheptin (2-amino-5-mitrothiazole) feeding. Poult. Sci. 32: 650-655.
- 1102. Pin T'eng. 1965. A preliminary observation of the mechanism of sterilization of the housefly (Musca vicina Macquart) treated with thiotepa. Acta Entomol. Sin. 14: 250.
- 1103. Piquett, P. G., and Keller, J. C. 1962. A screening method for chemosterilants of the housefly. J. Econ. Entomol. 55: 261–262.
- 1104. Plapp, F. W., Jr., Bigley, W. S., Chapman, G. A., and Eddy, G. W. 1962. Metabolism of methaphoxide in mosquitoes, houseflies, and mice. J. Econ. Entomol. 55: 607-613.
- 1105. Plus, N. 1966. Action comparee de la 5-fluorodesoxyuridine (FUDR) et de la fluorouridine (FUR) sur le rythme de ponte des Drosophiles, C. R. Acad. Sci. 268: 1504-1507.
- 1106. Pollard, M., Moore, R. W., Starr, T. J., and Tanami, Y. 1960. Ultraviolet microscopy of Psittacosis virusinfected cells treated with antibiotics and with antimetabolites. Antimicrob. Agents Annu. pp. 272-275.
- 1107. Pollock, J. N. 1971. Sterility and the mated status test m tepa-treated male sheep blowflies, *Luctia sericata* (Mg.) (Dipt., Calliphoridae). Bull. Entomol. Res. 60; 663-670.
- 1108. Pomonis, J. G., Severson, R. F., Hermes, P. A., Zaylskie, R. G., and Terranova, A. C. 1971. Analysis of insect chemosterilants: Action of phosphate buffers on aziridine, Anal. Chem. 43: 1709-1712.
- 1109. Powell, J. R., and Craig, G. B 1970. Inhibition of male accessory glands on Aedes aegypti by larval treatment with apholate. J. Econ. Entomol. 63: 745–748.
- 1110. Prabhu, V. K., K., and Nayar, K. K. 1972. Changes in blood proteins in the cockroach *Periplaneta* americana after chemosterilization with metepa. Entomol. Exp. Appl. 15: 417-422.
- 1111. Prager, J. C., and Mahoney, J. B. 1969. Annulment of azirdine (apholate)-induced growth inhibition in the estuarine flagellate Tetraselmus subcordiformis by some purines and pyrimidines. J. Protozool. 16: 187-190.
- 1112. Prokopy, R. J. 1967. Wooden apples treated with chemosterilants lure costly pest. Front. Plant Sci. 19(2): 4-5.
- •1113. Proverbs, M. D. 1969. Induced sterilization and co-

- insects Annu Rev. Entomol 14: 81-102
- 1114 Pruszynski, S., and Lipa, J. J. 1969. Chemosterilants in insect control. Postepy Nauk Roln. 16(3-4), 63-82. [In Polish.]
- 1115 Przezdziecki, Z., and Bankowska, J. 1967. Mozliwosc zastosowama chemosterylantow w ochronic roslin. Biul. Inst. Ochron. Rosl. No. 36, pp. 323-327.

#### Q

- 1116 Quieshi, S. A. 1972. Insect control by chemosterilants. Pak J. Sci. Ind. Res. 9(1-2); 20-25.
- 1117 , Mohuddin, S., and Ashrafi, S. H. 1972. Chemosterilization of PCSIR-strain of housefly Musca domestica by tepa, hempa, and hemel. Pak. J. Zool. 4 73-77.
- 1118 ———, Mohuddin, S., and Naqvi, S. N. H. 1971 Prehminary screening tests of antifertility compounds inhibiting the reproduction in housefly, *Musca domestica*. Pak. J. Sci. Ind. Res. 14(4-5): 374-376

#### R

- 1119 Raghuwanshi, O P. 1969. Mating vigour and sexual competitiveness of chemosterilized male of Culex fatigans. Botyu-Kagaku Bull. Inst. Insect Control 84, pp. 124-126.
- 1120 ——, Ahmad, I., and Khan, N. H. 1968. Effects of apholate on the bionomics of Musca domestica nebula Fabr. Botyu-Kagaku 33, 119-122.
- 1121. Rahaikar, G. W., Harwalkar, M. R., and Khaire, S. N. 1971. Chemosterilization of potato-tuber-worm, Phthorimaea operculella. II. Factors modifying the steribzing effect of metepa. Proceedings of Panel, Application of Induced Sterility for Control of Lepidopterous Populations, IAEA, Vienna, 1971, pp. 135-140.
- 1122. Rai, K. S. 1964. Cytogenetic effects of chemosterilants in mosquitoes. I. Apholate-induced aberrations in the somatic chromosomes of Aedes aegypti L. Cytologia 29 346–353.
- 1123. . 1964 Cytogenetic effects of chemosterilants in mosquitoes. II. Mechanism of apholate-induced changes in fecundity and fertility of Aedes aegypti (L.) Biol. Bull. 127(1) 119-131.
- 1124. ——. 1965. Cytogenetics of chemosterilant induced sterility in the mosquito *Aedes aegupti* L Proc. 12th Int. Congr. Entomol., London, 1965, pp. 255–256.
- 1125. . . 1967. Cytogenetics of *Aedes aegypti*. Bull. WHO 36; 563-565.
- 1126. ——. 1968. The status of the sterile male technique for mosquito control. Proc. Sterile-male Tech. Erad. Control Harmful Insects, Joint FAO/IAEA, Vienna (May 27-31, 1968), pp. 107-114.
- 1127. —, and Sharma, V. P. 1972. Cytogenetic effects of chemosterilants in mosquitoes. III. Development of transplanted ovaries in normal and chemosterilized females of Aedes aegypti. J Genet 60: 266-271.
- 1128 Rajagopalan, P. K., Yasuno, M., and LaBrecque, G. C. 1973. Dispersal and survival in the field of chemosterrlized, irradiated and cytoplasmic incompatible males of Culex pipiens fatigans. Bull. WHO 48: 631-636.
- 1129. Rapoport, I. A. 1947. Inheritance changes taking place under the influence of diethylsulphate and dimethyl sulphate. Dokl. Vses. Akad. S-kh. Nauk 12: 12-15.

- 1131. Ratcliffe, R. H., and Ristich, S. S. 1965. Insect sterilant experiments in outdoor cages with apholate, metepa, and four bifunctional azridine chemicals against the housefly, J. Econ. Entomol. 58: 1079–1082.
- 1132 Ratnayake, W. E. 1968. Effects of storage on dominant lethals induced by alkylating agents (tricthylene melamine and ethylenimine). Mutat. Res. 5; 271–278.
- 1133. Reddi, O. S., and Auerbach, C. 1961. Sensitivity of Drosophila testis to tri-ethylene melamine (TEM). Genet. Res. 2: 63-69.
- 1134. Redfern, R. E. 1970. Evaluations of candidate chemosterilants for control of two-spotted spider mites. J. Econ. Entomol. 63: 357–359.
- 1185 ——, Mills, G. D., Jr., and Sonnet, P. E. 1972.
  Aziridines as potentiators of juvenile hormone activity
  in tests on the yellow mealworm and the large milkweed bug. J. Econ. Entomol. 65 1605-1607.
- 1136. Reineeke, L. H., Klassen, W., and Norland, J. F. 1969. Damage to testes and recovery of fertility in bolt weevils fed chemosterilants. Ann. Entomol. Soc. Amer. 63: 511-525.
- 1187. Retnakaran, A. 1970. Metepa as a chemosterilant for the adult male spruce budworm, Charistoneura fumiferana. J. Econ. Entomol. 63: 1394-1395.
- 1138. ———. 1971. Thiotepa as an effective agent for mass sterilizing the spruce budworm, *Choristoncura fumiferana* (Lepidoptera: Torticidae). Can. Entomol. 103: 1753-1756.
- 1139. ——, and French, J. 1971. A method for separating and surface sterilizing the eggs of the spruce budworm, Choristoneura fumiferana (Lepidoptera: Tortricidae). Can Entomol. 103: 712-716.
- 1140. Rezabova, B. 1968. Changes in the metabolism of nucleic acids in the ovaries of the housefly, Musca domestica, after application of chemosterilants. Acta Entomol. Bohemoslov. 65: 331–340.
- Hora, J., Landa, V., Cerny, V., and Sorm, F.
   1968. On steroids CXIII. Sterilizing effect of some 6-ketosteroids on housefly Musca domestica L.
   Steroids 11: 475-496.
- 1142. ——, and Landa, V. 1967. Effect of 6-azuridine on the development of the ovaries in the housefly *Musca domestica* L. (Diptera). Acta Entomol. Bohemoslov. 64: 344–351.
- 1143. ——, and Landa, V. 1968. Effects of thalidomide on the development of the housefly Musca domestica L. Acta Entomol. Bohemoslov. 65: 212-215.
- 1144. ——, and Turner, R. B. 1968. Effect of chemosterilants on ovarian mitochondria of the housefly, *Musca domestica* (L.). Presented at Federation European Biochemical Societies, Prague, July 15–18, 1968.
- 1145. ——, and Turner, R. B. 1968. Isolation and respiratory activity of mitochondria in developing ovaries of the housefly, *Musca domestica* (L.). Presented at Federation European Biochemical Societies, Prague, July 15–18, 1968.
- 1146. Riddiford, L. M., and Williams, C. M. 1967. The effects of juvenile hormone analogues on the embryonic development of silkworms. Proc. Natl. Acad. Sci. U.S.A. 57; 595-601.
- 1147. Ridgeway, R. L., Jones, S. L., and Lindquist, D. A. 1965.

6

- Effect of American Cyanamid CL-47081 on fecundity and longevity of the boll weevil J. Econ. Entomol 58, 790–791
- 1148. ——, Gorzycki, L. J., and Lindquist, D. A. 1966. Effect of metabolite analogs on larval development and oviposition in the boll weevil. J. Econ. Entomol. 59 143-146.
- 1149 Riedel, Von Martin 1967 Zur biologie, zucht und sterilisation der kohlfliege *Phorbia brassicae* Bouche, unter besonderer berucksichtigung ihres vorkommens im rettichanbau Bayer, Landwirtsch Jahrb 44, Jahrgang, Heft 4; 386–429
- Riemann, J. G. 1969. Competitive mating tests between normal and aspermic male houseflies. J. Econ. Entomol 62: 276–277.
- 1151 Ristich, S. S., Ratcliffe, R. H., and Perlman, D. 1965 Chemosterilant properties, cytotoxicity, and mammalian toxicity of apholate and other P-N ring chemicals. J. Econ. Entomol. 58: 929-932.
- 1152. Riviello, M. S., and Shaw, J. G. 1966 Use of field bait stations in chemosterilant control of the Mexican fruit fly. J. Econ. Entomol. 59: 753-754
- 1153. Roach, S. H , and Buxton, J. A. 1965. Apholate and tepa as chemosterilants of the plum curculio. J. Econ. Entomol. 58: 802-803.
- 1154. Robbins, W. E., Kaplanis, J. N, Thompson, M. J., Shortino, T. J., Cohen, C. F., and Joyner, S. C. 1968. Ecdysones and analogs: Effects on development and reproduction of insects. Science 161: 1158–1159.
- 1155. Robinson, A G 1959 Note on fecundity of the pea aphid, Acyrthosiphon pusum (Harris), caged on plants of broad bean, Vicia faba L., treated with various plant growth regulators Can. Entomol. 91: 527-528.
- 1156. ———. 1960. Effect of maleic hydrazide and other plant growth regulators on the pea aphid, Acyrthosephon pisum (Harris), caged on broad bean, Vicia faba L. Can. Entomol. 92; 494–499.
- 1157. ——. 1961. Effects of amitrole, zytron, and other herbicides or plant growth regulators on the pea aphid, Acynthosiphon pisum (Harris) caged on broad bean, Vicia faba L. Can. J. Plant Sci. 41; 418–417.
- 1158. Roe, F. J. C. 1964. Natural, metallic and other substances, as carcinogens. Brit Med. Bull. 20; 127-133.
- 1159. Rohrborn, C. 1959. Mutagenitatsuntersuchungen mit 1,4 - dimethylsulfonoxy - 1,4 - dimethylbutan an Drosophila melanogaster Z. Vererbungsl. 90: 457-462.
- 1160. . 1962. Chemische Konstitution und mutagene Wirkung II. Trazmderivate. Z. Vererbungsl. 93·1-6.
- 1161. Roessner, P., and Cmatl, J. 1971. Effect of tris-1-aziridinyl phosphune oxide on cell cultures. Cesk. Hyg. 16(4/5): 151-154. [In Czechoslovakian.]
- 1162. Rosenfeld, I., and Beath, O. A. 1954. Effect of selennum on reproduction in rats. Proc. Soc. Exp. Biol. 87: 295.
- 1163. Ross, W. C. J. 1962. Biological alkylating agents. 232 pp. Butterworth & Co., Ltd., London.
- 1164. Rukawischnikov, B. I. 1966. Sterilisation als Bekampfungsmethode von Schadinsekten (Literaturubersicht). Moskau 2: 14–180.
- 1165. ——. 1966. Strahlen und chemische sterilisation von Schadinsekten. Itogi Nauki, Zool. Moskau, S.: 6–129.
- 1166. ———. 1967. Chemical sterilization of pests. Z. Rast. 12(3): 46–51.
- 1167. ———. 1963. Chemical sexual sterilization of harmful in-

- 1168 Sacca, G. 1961. Esperienze con mosche domestiche, sterilizzate con raggi X. Estratto Rend. Ist. Super. Sanita 299(24): 5-12.
- 1169. ——, Magaudda, P. L., and Guarmera, D. 1967. Un esperimento di lotta integrata (Chimica e biologica) contro Musca domestica I., alle isole Lipari. (Nota preliminare.) Riv. Parassitol 28; 295-307.
- 1170 Magrone, R., and Schocchi, A. 1965. Sulla repellenza esercitata da alcuni chemosterilanti verso *Musca domestica* L. Riv. Parassitol 26: 61–66.
- 1171——, and Scirocchi, A. 1966. An attempt to select a strain of *Musca domestica* L. resistant to metepa. WHO/Vector Control/66 192–5.
- 1172 , Scirocchi, A., DeMeo, G. M., and Mastrilli, M. L.
   1966. Una prova di campo con il chemosterilante hempa (esametilfosforammide) contro M. domestica
   L. Atti Soc. Peloritana Sci. Fis. Mat. Nat. XII, pp. 457-464.
- 1173 ——, Scirocchi, A., and Mastrilli, M. L. 1971. Studies on chemosterilization of *Culex pipiens* L. Riv. Parassitol. 32: 219–227.
- 1174. ——, Scirocchi, A., and Stella, E. 1966. Un esperimento di laboratorio sulla efficacia e sulla persistenza di un'esca liquida a base di hempa (esametilfosforammide) per il controllo di M. domestica L. Atti. Soc. Peloritana Sci. Fis. Mat. Nat. XII, pp. 465–468.
- 1175 ———, Scirocchi, A., Stella, E., Mastrilli, M. L., and DeMeo, G. M. 1966. Studiosperimentale di un ceppo di M. domestica L. selezionato con il chemosterilante metepa Atti Soc. Peloritana Sci. Fis. Mat. Nat. XII, pp. 447–456.
- 1176 ——, and Stella, E. 1964. Una prova di campo per il controllo di *Musca domestica* L. mediante esche liquide a base del chemosterilante tepa (=afoxide). Riv. Parassitol. 25; 279–294.
- 1177. ——, Stella, E., and Magrone, R. 1964. A field trial against *Musca domestica* L., by hquid baits of aphoxide. 1st International Congress of Parasitology, Rome, Italy, Sept. 1964.
- 1178. ———, Stella, E., and Magrone, R. 1964. Richerche di laboratorio sull'efficacia sterilizzante del Tepa (Afoxide) e dell'afolate, in *Musca domestica*. Riv. Parassitol. 25: 207–216.
- 1179. ———, Steila, E., and Magrone, R. 1964. Richerche preliminari sull'azione dell'afoxide (ossido di tris-(1-aziridinil) fosfato) su *Musca domestica* L. Parassitologia (Rome) 6(1-2): 229-234.
- 1180. Saito, K., and Hayashi, S. 1967. Observations on the effect of alkylating chemosterilants, metepa and hempa on the mosquito, Culex pipiens molestus Forskal, using a bait and dipping techniques. Jap. J. Sanit. Zool. 18, 122-126.
- 1181. ——, and Hayashi, S. 1968. Observations on the effect of alkylating chemosterilants, metepa and hempa, on the mosquito *Cutex pipiens molestus* Forskal, using contact technique. Jap. J. Sanit. Zool. 19: 62-66.
- 1182. Salama, A., Bakry, N., and Eldefrawi, M. 1971. Effect of metepa on mating behaviour of Spodoptera littoralis (Boisd.) Z. Angew. Entomol. 68: 83-90.
- 1183. Salama, H. S. 1972. Zinc sulfate induces sterility in the

- cotton leatworm Spodoptera littoralis Experientia 28 1318
- 1184. ——, and El-Sharaby, A. M. 1972. Gibberellic acid and beta sitesterol as sterilants of the cotton leaf worm. Spoilophera litteralis. Experientia 28: 413-414.
- 1185 Samis, H. V., Baird, M. B., and Massie, H. R. 1972. Renewal of catalase activity in *Drosophila* following treatment with 3-amino-1,2,4-triazole, J. Insect Physiol. 18, 991-1000.
- 1186 Sandesco, I 1967 Chemical sterilization of the species Anophales labranchine atroparvus by treatment of the larval stage Arch. Roum. Pathol. Exp. Microbiol 26 181-188
- 1187 ——— 1967 Chemosterihsation des anopheles du groupe Macalipennis—Colonie de laboratoire et de ternun—Par traitement du stade adulte. Arch Roum, Pathol Exp Microbiol. 26: 821-828,
- 1188. ——, Ciplea, Al. Ch., and Tien, V. 1968. Pathomorphological changes in the ovaries of *Anpheles* [sic] labranchiae atroparcus under the influence of hempa and thiotepa. Arch. Roum Pathol. Exp. Microbiol. 27, 479-494
- 1189 ——, and Tieu, V. 1970. Embryonic pathological modifications in Anopheles labranchiae atroparvus under the action of the chemosterihzer hempa. Arch Roum. Pathol Exp. Microbiol. 29, 437—446.
- 1190 Sannası, A 1969. Inhibition of ovary development of the fruit-fly, *Drosophila melanogaster* by synthetic "queen substance" Life Sci. 8(11): 785-789.
- 1191 Sanyal, S. N 1950. Sterility effect of the oil of Pisum satirum. Calcutta Med. J. 47: 313-327.
- 1192. 1952 Sterlhty effect of Pisum sativum (Linn), Calcutta Med. J. 48: 399–404,
- 1193 —— 1952. Sterility effect of Pisum sativum (Linn). Chemical study. Calcutta Med. J. 49, 343–347.
- 1194 1952 Sterlity effect of Pisum sativum (Linn), Biological study. Calcutta Med. J. 49: 354-359.
- 1195 Sartorelli, A. C., and Booth, B. A. 1965. Synergistic antineoplastic activity of combinations of mitomycins with either 6-thioguanine or 5-fluorouracil, Cancer Res. 25: 1393-1400.
- 1196. Savena, S. C. 1968. Studies on the effect of chemosterilants. I. Chemosterilization in insects with special reference to grasshoppers and cockroaches. Proc. Symp. Nat. Resources Raj. Oct.
- 1198 , and Aditya. V. 1969. Histopathology and histochemistry of the insects treated with chemosterilants I. On the observations in active testes of Paceilocerus [sic] pictus (Orthoptera: Aerididae) treated with apholate. Cytologia (Tokyo) 34: 399-404.
- 1199 —, and Adıtya, V. 1969. Histopathology and histochemistry of insects treated with chemosterilants.

  II. On the studies of DNA in active testes of Poicelocerus [sic] pictus (Orthoptera: Acrididae) treated with apholate. Cytologia (Tokyo) 34: 405-407.
- 1200. —, and Aditya, V. 1971. Histopathology and histochemistry of the insects treated with chemosterilants. III. Nucleic acids, phospholipids, and phosphatases in the testes of chemosterilized Poeculocerus pictus Isr. J. Entomol. 6: 195-210.

- 1201. ——, and Aditya, V. 1973. Histopathology and histochemistry of the insects treated with chemisterilants, IV On the seminal vesicles and accessory glands of Poicelocerus [sic] pictus treated with apholate and tepa, Bull, Environ. Contam. Toxicol. 9: 218-221.
- 1202. Citation deleted.
- 1203. Schaefer, C. H. 1967. Studies on the mode of action of the chemosterilants 2-imidazolidinone and 4-imidazoline-2-one in the housefly and in the large milkweed bug. Life Sci. 6: 2677-2683.
- 1204. ——, and Tieman, C. H. 1967. 4-midazohne-2-one: An insect growth-inhibitor and chemosterilant, J. Econ, Entomol. 60: 542-546.
- 1205 Scherney, F., and Haisch, A. 1968. On the rearing and sterilisation of insect pests, especially the Mediterra nean fruit-fly C. capitata Wied. Anz. Schaedlingskd. 41: 7-14. [In German.]
- 1206. Schmeer, M. R. 1966. Mercene: Growth-inhibiting agent of mercenairia extracts—Further chemical and biological characterization. Ann. N. Y. Acad. Sci. 136(Artic. 9): 211–218.
- 1207. Schmidt, C. H., Dame, D. A., and Weidhaas, D. E. 1904. Radiosterilization vs chemosterilization in houseffics and mosquitoes. J. Econ. Entomol. 57: 753-756.
- 1208. Schroeder, F., and Beiber, L. L. 1972. Effects of filipin and cholesterol on housefly, Musca domestica L., and wax moth, Galleria mellonella L. Chem. Biol. Interactions 4: 239-249.
- 1209. Schroeder, H. A., and Mitchener, M. 19'(1. Selenium and tellurium in rats: Effect on growth, survival and tumors. J. Nutr. 101, 1531-1540.
- 1210. Schumakow, E. M. 1968. Main currents in research concerning sterilization methods of insects. Pflanzenschutzberichte 38:12): 157-165.
- 1211. Citation deleted.
- 1212. Schumakow, E. M., and Bulyginskaya, M. A. 1967. Sterilisation als Bekampfungsmethode von Schadinsekten. Schutz der landwirtschaftlichen Kulturen vor Schadlingen, Krankheiten und Unkrautern. No. 1, Moskau, pp. 54-62.
- 1213. ——, Bulygmskaya, M. A., and Kropachova, A. A. 1965. Derivatives of ethylenimine for sexual sterifization of harmful moths in the field. Proc. IX Mendeleev Congr. Pure Appl. Chem. (Moscow), Part 2, pp. 270–272. [In Russian.]
- 1214. ——, Bulyginskaya, M. A., and Kropachova, A. A. 1966. Activity of ethyleneimine compounds as chemical sterilizers for Lepidoptera. Khim. Sel'sk. Khoz. 4: 342–345.
- 1215. ——, Bulyginskaya, M. A., and Kropachova, A. A. 1966 Einsatz von Athylenumen-Verbindungen als Chemosterilisatoren fur Lepidopteren. Chimija w Selsk. Choz.-we, S.: 22-25,
- 1216. Schuster, M. F., and Boling, J. C. 1969. Insect sterilant experiments with apholate and five bifunctional aziridine chemicals in outdoor cages against the boll weevil. J. Econ. Entomol. 62: 1872-1875.
- 1217. Schwartz, P. H., Jr. 1964. Reproduction and chemical sterilization of the eye gnat Hippelates pusio Loew. Ph. D. Thesis, University of Florida, Gainesville.
- 1218. ——. 1965. Effects of apholate, metepa, and tepa on reproductive tissues of *Hippelates pusio* Loew. J. Invert. Pathol. 7: 148-151.
- 1219. Schwerdtfeger, F. 1966. Chemosterilization as method of

- pest-control in forest Umschau 66(17), 571,
- 1220 , and Von Ehrhardt, W. 1966. Zur Eignung von Chemosterilant für die Forstschadlingbekampfung vorlaufige Mitteilung über erste Versuche mit dem Borkenkafer Ips typographus L. Forstwirscht, Holzwirtsch, 21, 343–344
- 1221. Seawright, J. A. 1972. A genetic study of apholate resistance in *Aedes aegypti*. J. Econ. Entomol 65 1357-1361.
- 1222. ——, Bowman, M. C., and Lofgren, C. S. 1973. Insect chemosterilants. Gas chromatography, p-values, and relationship of p-values to sterilant activity in pupae of *Anopheles albimanus*. J. Econ. Entomol. 66: 613–617.
- 1223. ——, Bowman, M. C., and Lofgren, C. S. 1973 Thioaziridine chemosterilants Uptake, persistence, and sterility in pupae and adults of Anopheles albimanus. J. Econ Entomol. 66: 305-308.
- 1224. ——, Bowman, M. C., and Patterson, R. S. 1971 Tepa and thiotepa: Uptake, persistence, and sterility induced in pupae and adults of *Culex pipiens* quinquefasciatus. J. Econ. Entomol. 64: 452-455.
- 1225. Segal, S. J., and Nelson, W. O. 1958. An orally active compound with antifertility effect in rats. Proc. Soc Exp. Biol. 98: 431-436.
- 1226. Sekun, N. P. 1971. Effect of chemical treatments on the feeding and fertility of insects. Tr. Velikoluk. S-kh. Inst. 17: 65-69. [In Russian]
- 1227. Serebrovsky, A. S. 1940. A possible new method of combating [stc] insect pests. Zool. Zh. 19: 618.
- 1228. Settepani, J. A., and Borkovec, A. B. 1966. Heterocyclic amines. A convenient synthesis of 3,5-diamino-1,2,4-triazime derivatives J. Heterocycl. Chem. 3: 188-190.
- 1229. ———, Brown, R. T., and Borkovec, A. B. 1973. Preparation of 1, 3-diaryl-2-imidazolidinones. J. Heterocycl. Chem. 10: 639–642.
- Crystal, M. M., and Borkovec, A. B 1969 Boron chemosterilants against screwworm flies, Structureactivity relationship, J. Econ. Entomol. 62; 375–383.
- 1231 ——, and Stokes, J. B. 1968. Heterocyclic amines. II. 3,5-diaminopyrazole. J. Org. Chem. 33: 2606.
- 1232. ——, Stokes, J. B., and Borkovec, A. B. 1970. Insect chemosterilants. VIII. Boron compounds. J. Med. Chem. 13: 128-131.
- 1233. Shama Rao, H. K., and Sears, E. R. 1964. Chemical mutagenesis in *Triticum*. Mutat. Res. 1: 387-399
- 1234 Sharma, N. 1973. Sublethal insecticide stress and its effect on reproduction in the housefly, Musca domestica, and the yellow fever mosquito, Aedes aegupti. Diss. Abstr. Int. B 34(1): 261-262.
- 1235. Sharma, V. P. 1971. Effectiveness of chemosterilants and gamma radiation in the sterilization of the tropical house-mosquito, *Culex fatigans*. Proc. Semin. Genet. Our Health, Indian Council of Medical Research, New Delhi (Apr. 5–8, 1971), pp. 129–134.
- 1236. ——, and Hollingworth, R. M. 1968. Incorporation of tritiated compounds during spermatogenesis. Proc. North Cent. Branch Amer. Assoc. Econ. Entomol. 23; 31.
- 1237. ——, Hollingworth, R. M., and Paschke, J. D. 1970. Incorporation of tritiated thymidine in male and female mosquitoes, Culex pipiens, with particular reference to spermatogenesis. J. Insect Physiol. 16: 429-436.

- 1238 ———, Patterson, R. S., Grover, K. K., and LaBrecque, G. C. 1973. Chemosterilization of the tropical house mosquito Cales fatigans Weid: Laboratory and field cage studies. Bull. WHO 48, 45–49.
- 1239 ——, and Rai, K. S. 1967 Sperm depletion in chemosterilized and normal males of the yellow fever mosquito, Acdes aeggpti. Can. Entomol. 99: 1116–1118
- 1240. ——, and Rai, K. S. 1969. Histopathological and developmental effects of the chemosterilant apholate on the mosquito Aedes aegypti. Mosq. News 29, 9.
- 1241. Shaw, J. G., and Riviello, M. 1962. Investigaciones sobre el empleo de productos quimos como esterilizantes sexuales para la mosca de la fruta. Ciencia 22(1-2): 17-20
- 1242 ———, Lopez, D. F., and Chambers, D. L. 1970. A review of research done with Mexican fruit fly and the citrus blackfly in Mexico by the Entomology Research Division, Bull. Entomol. Soc. Amer 16, 186–193.
- 1243 , Patton, W. P., Riviello, M. S., and Spishakoff, L. M. 1966. Mexican fruit fly control. Calif. Citrogr. 51, 209-214.
- 1244 ———, and Riviello, M. S. 1962. Sterility in the Mexican fruit fly caused by chemicals. Science 137: 754-755
- 1245. ——, and Riviello, M S. 1963. El efecto de la superabundancia en la liberacion de moscas de la fruta, Anastrepha ludens (Loew) infestacion en mangoes. [Abstr.] Folia Entomol. Mex., p. 13.
- 1246. ——, and Riviello, M. S. 1963. Eficacia de mosca de la fruta (*Anastrepha ludens* Loew) externizadas con tepa y liberadas en una huerta de mangos. Fitofilo XVI(38), 12-16.
- 1247 ———, and Riviello, M. S. 1965. Effectiveness of tepasterilized Mexican fruit flies released in mango grove. J. Econ. Entomol. 58: 26–28.
- 1248. ——, Riviello, M. S., Spishakoff, L. M., Trijillo, G. P., and Lopez, D. F. 1967. Dispersal and migration of tepa-sterilized Mexican fruit flies. J. Econ. Entomol. 60: 992-994.
- 1249 Shealy, Y. F., and O'Dell, C. A. 1966. Triazeno-upsulon-triazole-4-carboxamides. Synthesis and anti-tumor evaluation. J. Med. Chem. 9: 733-737.
- 1250. Shellenberger, T. E., Skinner, W. A., and Lee, J. M. 1967. Effect of organic compounds on reproductive processes. IV. Response of Japanese quail to alkylating agents. Toxicol. Appl. Pharmacol. 10: 69–78.
- 1251. Sherman, J. K., and Steinberger, E. 1960. Effect of triethylenemelamine on reproductive capacity of mouse spermatozoa. Proc. Soc. Exp. Biol. Med. 103; 348-350.
- 1252. Sherman, M., and Herrick, R. B. 1966. Acute and subacute toxicity of apholate to the chick and Japanese quail, Toxicol. Appl. Pharmacol. 9: 279-292.
- 1253. Shinohara, H., and Nagasawa, S. 1963. Sterilizing effect of apholate and metepa on adults of the Azuki bean weevil, Callosobruchus chinensis L. 1. Studies on the chemosterilants of insects. Entomol. Exp. Appl. 6: 263-267.
- 1254. Shipp, E., and Osborn, A. W. 1966. The theoretical role of predators in sterile-insect release programs. Bull. Entomol. Soc. Amer. 12: 115.
- 1255. Shive, W. 1952. Biological activities of metabolite analogues. Annu. Rev. Microbiol. VI; 437-466.
- 1256. ——, and Skinner, C. G. 1958. Metabolic antagonists.
  Annu. Rev. Biochem. 27: 643-678.

- 1257. Shott, L. D., Borkovec, A. B., and Knapp, W. A., Jr. 1971. Toxicology of hexamethylphosphoric trianide in rats and rabbits. Toxicol. Appl. Pharmacol. 18 499-506
- 1268. Shumakov, E. M. 1967. Main trends in research dealing with methods of insect sterilization. 6th Int. Congr. Plant Prot., Vienna, 1967 (Abstr.), pp. 88-89.
- 1259 Bulygmskaya, M. A., and Kropachova, A. A. 1966. Activity of ethylenemine compounds as sterilants for Lepidoptera. Khim. Sel'sk. Khoz. 5: 22-25.
- 1260. Simkover, H. G. 1964, 2-Imidazolidimone as an insect growth inhibitor and chemosterilant, J. Econ. Entomol. 57, 574-579.
- 1261. Simpson, H. R. 1958 The effect of sterilized males on a natural tsetse fly population. Biometrics 14, 159–178.
- 1262. Singh, O. P., and Teotia, T. P. S. 1968. A simple apparatus for dipping treatment of insects for varying periods of time. Indian J. Entomol. 30, 251-253.
- 1263. Skelton, T E, and Hunter, P. E. 1970. Tepa [tris(1-azardinyl)phosphineoxide] sterilization and its effect upon respiration of the spotted cucumber beetle, Diabrotica undecompunctata howards. Ann. Entomol. Soc. Amer. 63: 335-336.
- 1264. ———, and Hunter, P. E. 1970 Flight and respiration responses in houseflies following topical application of sterilization levels of tepa. Ann. Entomol. Soc. Amer 63; 770–772
- 1265. Skinner, W. A. 1968. Chemosterilants for rodent control. Proceedings, Rodents as Factors in Disease and Economic Loss—Asia/Pacific Interchange (June 17-27, 1968), pp. 192-202
- 1266. ——, Cory, M., Shellenberger, T. E., and Degraw, J. I. 1966. Effects of organic compounds on reproductive processes. III. Alkylating agents derived from various diamnes. J. Med. Chem. 9; 520-522.
- 1267. ——, Cory, M., Shellenberger, T. E., and Degraw, J. I. 1967 Effect of organic compounds on reproductive processes. V. Alkylating agents derived from aryl-, aralkyl-, and cyclohexylmethylenediamines. J. Med. Chem. 10; 120-121.
- 1268. ——, and Tong, H. C. 1968. Effect of alkylating agents derived from diamines on fertility of the male mouse. Experientia 24: 924–925.
- 1269. ——, and Tong, H. C. 1972. Controlling rodents with N,N'-bis(aziridinylacetyl)polymethylenediamine chemisterilants. U.S. Pat. 3,636,212.
- 1270. , Tong, H. C., Shellenberger, T. E., and Newell, G. W. 1965. Effect of organic compounds on reproductive processes. I. Alkylating agents from octamethylenediamine and various xylylenediamines. 150th Meet. Amer. Chem. Soc. (Sept. 12–17, 1965). Abstracts of papers, p. 28A.
- 1271. ——, Tong, H. C., Shellenberger, T. E., and Newell, G. W. 1965. Effect of organic compounds on reproductive processes. I. Alkylating agents from octamethylenediamine and various xylylenediamines. J. Med. Chem. 8: 647-650.
- 1272. Smith, B. C., and Berube, J. A. 1966. Effects of sex sterilants on the growth of coccinellid larvae (Coleoptera; Coccinellidae). Can. Entomol. 98: 1005.
- Smith, C. N. 1968, Prospects for vector control through sterilization procedures. Bull. WHO 29, Suppl., pp. 99-106.
- 1274. \_\_\_\_\_. 1963. Chemosterilants as a potential weapon for

- insect control, Adv. Chem. Ser. 41, 38-41.
- 1275. ——. 1966. New approaches to the control of pest organisms. Amer. Soc. Agron. Spec. Publ. 8, pp. 145-150
- 1276. ——. 1966 I. Vector control with chemicals not used as insecticides. II Effectiveness of some carbamate insecticides in louse powders. Expert Committee on the Safe Use of Pesticides in Public Health, Geneva, WHO, Sept 21–27, 1966.
- 1278. ———. 1967 Possible use of the sterile-male technique for control of Aedes acqueti, Bull, WHO 36; 633-635.
- 1279. ——. 1971. Genetic control of mosquitoes: Programme of the WHO/ICMR collaborative research unit. Proc. Semin Genet. Our Health, Indian Council of Medical Research, New Delhi (Apr. 5-8, 1971), pp. 120-122.
- 1280 ——, and Dame, D. A. 1963. Chemosterilisation—A new field of research in tsetse fly control. Bull. Epizoot. Dis. Afr II; 403-414.
- 1281. ——, LaBrecque, G. C., and Borkovec, A B. 1964. Insect chemosterilants. Annu. Rev. Entomol. 9: 269-284.
- 1282. Smith, F. F. 1964. Chemosterilant treatment of two greenhouse spider mites. Proc. XII Int. Congr. Entomol, London (July 8-16, 1964), p. 518.
- 1283. ——, Boswell, A. J., and Henneberry, T. J. 1965. Chemosterilant treatment of two greenhouse spider mites. J. Econ. Entomol. 58: 98–103.
- 1284. Smith, P. K., Nadkarni, M. V., Trains, E. G., and Davison, C. 1958. Distribution and fate of alkylating agents. Ann. N.Y. Acad. Sci. 68; 834-850.
- 1285. Smith, R. K., Miller, D. A., and Armbrust, E. J. 1974. Effect of boron on alfalfa weevil oviposition. J. Econ. Entomol. 67: 180.
- 1286 Smith, W. W., and Lee, L. J. 1971. Toxicities of thiotepa, tepa, metepa and hempa to late aquatic stages of Culex nigripalpus Theobald. Mosq. News 31: 390-394.
- 1287. Smittle, B. J. 1965. The effects of tepa on the embryogeny and reproductive organs of the German cockroach, Blatella germanica (L.). Diss. Abstr. 25: 6856.
- 1288. ——, Mount, G. A., Das, M., and Rajapaksa, N. 1968. Apholate and gamma urradiation compared as sterilants for Culex pipiens quinquefasciatus Say (Diptera; Cuhridae). Mosq. News 28: 201–214.
- 1289. ——, Schmitt, J. B., and Burden, G. S. 1966. Effects of tepa on the reproductive organs and embryogeny of the German cockroach. J. Econ. Entomol. 59: 1419-1423.
- 1290. Snow, J. W., Young, J. R., and Jones, R. L. 1970. Competitiveness of sperm in female fall armyworms mating with normal and chemosterilized males. J. Econ. Entomol. 63: 1799-1802.
- 1291. ——, Lewis, W. J., and Sparks, A. N. 1970. Mating of normal and sterilized colonized and native corn earworms with emphasis on failure of pairs to separate after copulation. J. Econ. Entomol. 63: 1873-1876.
- 1292. Snyder, L. A. 1963. Evidence of an essential difference between point mutations and chromosome breaks induced by triethylene melamine in *Drosophila* spermatozoa. Z. Vererbungsl. 94: 182-189.
- 1293. ----, and Oster, I. I. 1964. A comparison of genetic

- changes induced by a monofunctional and a polyfunctional alkylating agent in *Drosophila melanogaster*. Mutat Res. I; 437–445
- 1294. Socha, R., and Sehnal, F. 1972. Inhibition of adult development in *Tenebrio molitor* by insect hormones and antibiotics. J. Insect Physiol. 18: 317–337
- 1295. Solomon, J. D. 1966. Tepa for sterilizing male carpenterworms, J. Econ. Entomol. 59: 1528-1529.
- 1296. Sonnet, P E 1967. Reaction of pyrrolidone with p-1-aziridinyl-N,N,N',N'-tetramethylphosphonic diamides. (Investigation of the chemistry of insect chemosterilants) J. Org. Chem 32: 248-250.
- 1297. ———, and Borkovec, A. B. 1966. Ring opening reactions of p-1-aziridinyl-N,N,N',N'-tetramethylphosphonic diamides. J. Org. Chem. 31: 2962–2966.
- 1298. Soto, P. E., and Graves, J. B. 1967. Chemosterilization of bollworms and tobacco budworms. J. Econ. Entomol. 60: 550-553.
- 1299. ——, Graves, J. B., and Clower, D. F. 1966. Chemical sterilization: A new approach to control the cotton bollworm. *Heliothis zea*. La. Agric. 9(3): 12–13
- 1300. Sprenkel, R. K., and Yendol, W. G. 1969. Effects of apholate on the alfalfa weevil. J. Econ. Entomol. 62: 122-125.
- 1301. Sram, R. J. 1972. The differences in the spectra of genetic changes in *Drosophila melanogaster* induced by chemosterilants tepa and hempa. Folia Biol. (Prague) 18: 139-148.
- 1302. ———, Zudova, Z. 1974. The relationship of mutagenic activity and the chemical structure of aklyl amino aziridines in mice. Folia Biol. (Prague) 20: 1-13.
- 1303. ———, Zudova, Z., and Benes, V. 1968. Induction of translocations in mice by tepa (tris(1-aziridinyl)-phosphine oxide). Folia Biol. (Prague) 16: 367-368
- 1304. Sriharan, T. P., Samson, M. V., and Krıshnaswami, S. 1972. Preliminary investigation on the chemical sterilization of the Uzi fly (*Tricholyga bombycis*) with apholate. Indian J. Seric. 10: 120–123.
- 1305. Srivastava, A. S. 1964. Recent advances on animal chemosterilants. L. J. Sci. Tech 2(4); 240-244.
- 1306. Staley, D. H. 1971. A mathematical model of an insect population with overlapping generations where the females are polyandrous and the males are subject to auto-sterilization. Ann. Entomol. Soc. Amer. 64: 325-330.
- 1307. Stamler, F. W. 1955. Reproduction in rats fed Lathyrus peas or amino-nitriles. Proc. Soc. Exp. Biol. N.Y. 90; 294–298.
- 1808. Steiner, L. F. 1965. Mexican fruit fly suppression at Tijuana. IAEA Tech. Rep. Ser. 44, p. 51.
- 1309. ——. 1969. A method of estimating the size of native populations of Oriental, melon, and Mediterranean fruit flies, to establish the overflooding ratios required for sterile-male releases. J. Econ. Entomol. 62: 4-7.
- 1310. ———, Mitchell, W. C., Harris, E. J., Kozuma, T. T., and Fujimoto, M. S. 1965. Oriental fruit fly eradication by male annihilation. J. Econ. Entomol. 58: 961–964.
- 1311. Stepanova, M. N. 1969. Technique for determining the prospects of using some chemosterilizing preparations from the group of ethylenimine derivatives against some species of synantropic flies. Med. Parazitol. Parazit. Bolez. 38: 39-46.
- 1812. ———. 1972. Sterilizing action of thiophosphoramide, dipm, and phosphimide in individual-dose feeding of

- single species of synanthropic flies 13th Proc. Int. Congr. Entomol. 1968, 3: 435 [In Russian]
- 1313. ——, Sykhova, M. N., Kropachova, A. A., and Sazonov, N. V. 1968. Chemosterilant for Muserdae and Calliphoridae fines. Izobret. Prom. Obraztsy, Tovarnye Znaki 45(24): 122.
- 1314. Stimmann, M. W., and Gough, D. G. 1971. Inherited sterility among progeny of cabbage loopers treated with tretamine J. Econ. Entomol. 64: 781-787.
- 1315. ——, Wolf, W. W., and Berry, W. L. 1973. Cabbage loopers. Biological effects of rubidium in the larval diet. J. Econ. Entomol. 66: 324–326.
- 1316. Stueben, M. 1969. Chemosterilants. Mitt. Biol. Bundesanst. Land Forstwirt. Berlin-Dahlem 133: 84.
  [In German.]
- Sturelid, S. 1972. Chromosome-breaking capacity of tepa and analogues in Vicia faba and Chinese hamster cells. Hereditas 68: 255–276.
- 1318. Sturtevant, J. 1970. Pigeon control by chemosterilization; Population model from laboratory results. Science 170: 322-324.
- 1319. Sugai, E. 1967. Embryonic mortality in the progeny of the male silkworm, Bombyx mort L., orally administered apholate in the larval stage (Lepidoptera: Bombycidae). Appl. Entomol. Zool. 2: 9-12.
- 1320. ——. 1967. Cytological studies on the male sterility of the silkworm, *Bombyx mori* L. Annu. Rep. Tokyo Univ. Agric. Tech. No. 10: 36–39.
- 1321. ——. 1967. Effect of apholate on reproductive organ of the female silkworm, *Bombyx mori* with special reference to histopathological observation of the ovaries. Jap. J. Appl. Entomol. Zool. 11: 66-70.
- 1323. ———, and Ashoush, I. 1970 Male sterility in the silkworm, Bombyz morz L., induced by aminopterin (Lepidoptera: Bombycidae). Jap. J. Appl. Entomol. Zool, 5: 202-207.
- 1824. ———, and Hirano, C. 1965. Studies on the male sterility in the silkworm, *Bombyx mori* L., induced by apholate. Jap. J. Genet. 40: 357–363.
- 1325. ——, and Hirano, C. 1967. Effect of apholate on the wing development of the silkworm, *Bombyx morn L.* Jap. J. Appl. Entomol. Zool. 11: 29-30.
- 1326. ——, and Mirumachi, M. 1973. Inherited sterility in the silkworm, *Bombyx mori* L., treated with apholate. Jap. J. Appl. Entomol. Zool. 17: 137–140.
- 1327. ——, and Suzuki, S. 1971. Male sterility in progeny of the male silkworm, Bombye mori, orally administered apholate, Jap. J. Appl. Entomol. Zool. 6: 126-130.
- 1328. and Uchino, T. 1969. Effect of aminopterin on oogenesis of the silkworm, Bombyx mori L. (Lepidoptera: Bombycidae). Jap. J. Appl. Entomol. Zool. 4: 114-120.
- Sukumar, K., and Naidu, M. B. 1973. Inhibition of ovarian growth by tepa in *Dysdercus cingulatus*. J. Econ. Entomol. 66; 20-22.
- 1330. Sutherland, D. J., Beam, F. D., and Gupta, A. P. 1967. The effects on mosquitoes of sublethal exposure to insecticides. I. DDT, dieldrin, malathion and the basal follicles of Aedes acgypti (L.). Mosq. News 27: 316-328.
- 1831. Swailes, G. E. 1966. Sterilization of the cabbage magget

- with apholate J Econ Entomol 59, 596-598
- 1332 Sweeley, C C 1971 Effect of polyene macrolides on growth and reproduction of Musca domestica and on the uptake of choicsterol in Galleria mellonella larvae Chem Biol. Interactions 2 247-253.
- 1333 Szybalski, W 1958, Special microbiological systems, II. Observations on chemical mutagenesis in microorganisms Ann. N.Y. Acad. Sci. 76(Artic. 3), 475-487.

#### 7

- 1334. Taber, S., III, and Borkovec, A. B. 1969. Chemical sterilization of honey bee spermatozoa in *in vitro*. Nature (Lond.) 224–1217–1218
- 1935. Tadano, T , and Kitzmiller, J B 1969. Chromosomal aberrations induced by the chemosterilant tepa in Culex papers fatigans Wiedemann, Pak J. Zool. 1: 93-96
- 1336 Tahori, A. S., Zeidler, G., and Halevy, A. H. 1965 The effect of phosfon (2,4-dichlorobenzyltributyl phosphonium chloride) as a housefly sterilant. Naturwissenschaften 52: 1-2.
- 1337. Takahashi, T. 1970. Systemic insecticides having sterilizing activity and exhibiting low toxicity towards warm-blooded animals. Brit. Pat. 1,216,360.
- 1338 Tamaki, G. 1973 Insect developmental inhibitors Effect of reduction and delay caused by juvenile hormone mimics on the production of winged migrants of Myzus persicae (Hemiptera, Aphididae) on peach trees. Can. Entomol. 105: 761–765.
- 1339. Tempel, K., and Jachde, M. 1970. Effect of 2,4,6-triethyleneimno-s-triazine and x-rays on chick embryo phosphatases. Tieraerztl. Wochenschr. 83: 299-302 [In German.]
- 1340. Tenhet, J. N 1947. Effect of pyrethrum on oviposition of the cigarette beetle J. Econ. Entomol. 40: 910.
- 1341. Terranova, A. C. 1969. The residual fate of N,N,-N',N'-tetramethyl-p-piperidinophosphonic diamide after injection, tarsal contact and topical application to the boil weevil. J. Econ. Entomol. 62; 821-823.
- 1342. \_\_\_\_\_, and Crystal, M. M. 1970. The fate of N,N'-tetramethylenbis(1-aziridinecarboxamide) in the black blow fly and the screwworm fly. J. Econ. Entomol. 63: 455-458.
- 1343 ——, and Schmidt, C. H. 1967 Purification and analysis of hempa by chromatographic techniques. J. Econ. Entomol. 60: 1659-1663
- 1344. Terriere, L. C., and Rajadhyaksha, N. 1964. Reduced fecundity of the two-spotted spider mite on metalchelate-treated leaves, J. Econ. Entomol. 57: 95-99.
- 1345. Terry, P. H. 1973. Insect chemosterilants. In C. A. Hampel and G. G. Hawley (eds.), Encyclopedia of Chemistry, 3d ed., pp. 568-569. Dan Nostrand Reinhold Co., New York
- 1346. ——, and Borkovec, A. B. 1965. Phosphoramides and thiophosphoramides as insect chemosterilants. U.S. Pat. 3,205,130.
- 1347. ——, and Borkovec, A. B. 1967. Insect chemosterilants. IV Phosphoramides. J. Med. Chem. 10: 118-119.
- 1348. \_\_\_\_\_, and Borkovec, A. B. 1968. Insect chemosterilants VI. Oxidation of hexamethylphosphoric triamide and the synthesis of N-formylphosphoramides. J. Med Chem. 11: 958-961.
- 1349. \_\_\_\_\_, and Borkovec, A. B. 1968. Insect chemosterilants.

- VII J Med Chem 11: 961
- 1350 ——, and Borkovec, A. B. 1970. Insect chemosterilants. IX N-(Hydroxymethyl)-N,N',N',N'',N'', pentamethylphosphoric triamide. J. Med. Chem. 13: 782-783
- 1351 —, and Borkovec, A. B. 1973. Insect chemosterilants
  XII. Phosphorus amides. J. Agric. Food Chem. 21,
  500-502.
- 1352. ——, Borkovec, A. B., and McHaffey, D. G. 1972. Chemosterilants against the boll weevil, 3. Phosphorus amides. J. Econ. Entomol. 65: 1550-1551.
- 1353. ——, Chang, S. C., and Borkovec, A. B. 1974 Chemosterilization by fumigation Effects of temperature and time of exposure, J. Econ. Entomol. 67: 17–18.
- 1354. ———, and Crystal, M. M. 1972 Chemosterilants against screwworm flies J. Econ. Entomol. 65: 307-310.
- 1355 Thiersch, J. B 1954 The effect of 6-mercaptopurine on the rat foetus and reproduction in the rat. Ann. N.Y Acad. Sci. 60: 220-227.
- 1357 1956 The control of reproduction in rats with the aid of anti-metabolites. Acta Endocrinol. (Copenhagen) Suppl. 28-37-45
- 1358. ———, 1957 Effect of o-diazoacetyl-L-serine on rat litter. Proc. Soc. Exp. Biol 94 27-32
- 1359. —— 1957. Effect of 6-diazo-5-norleucine (DON) on the rat litter in utero. Proc. Soc. Exp. Biol. 94: 33-35.
- 1360 ———. 1957. Effect of 2,4,6 triamino-"S"-triazme (TR), 2,4,6 "tris"(ethylenemino)-"S"-triazine (TEM) and N,N',N"-triethylenephosphoramide (TEPA) on rat htter *in utero* Proc Soc. Exp. Biol. 94, 36-40
- 1361. ——, 1957. Effect of 2-6 diaminopurme (2-6 DP) 6 chlorpurme (CIP) and thioguanine (ThG) on rat litter in utero, Proc. Soc. Exp. Biol. 94: 40-43.
- 1362. —— 1958 The effect of alazopeptine on the litter and fetus of the rat in utero. Proc. Soc. Exp. Biol. 97: 888-889.
- 1363. ———, 1958 The effect of N-desacetylthiocolchicine (TC) and N-desacetylmethylcolchicine (MC) on the rat litter and fetus in utero. Proc. Soc Exp. Biol. 98: 478–485.
- 1364. ——, and Philips, F. S. 1950. The action of 4-aminopteroylglutamic acid on the early pregnancy of rats and mice. Fed. Proc. Fed. Amer. Soc. Exp. Biol. 9: 346.
- pteroylglutamic acid (aminopterin) on early pregnancy. Proc Soc. Exp. Biol 74: 204-208.
- 1366. Thompson, R. Q., Sturtevant, M., and Bird, O. D. 1958. Effect of phosphorylated hesperidin and other flavonoids on fertility in mice. Science 118: 657.
- 1367. Thorpe, D. R., and Ware, G. W. 1963. Nitrofurans as chemosterilants of stored-grain insects. J. Econ. Entomol. 56: 404-407.
- 1368. Timmis, G. M., and Williams, D. C. 1967. Chemotherapy of cancer. 229 pp. Butterworth & Co., London.
- 1369. Tipnis, H. P. 1970. Molecular biology and insect control. V. Chemosterilants, new approach in pest control. Pesticides 4: 15-20.
- 1370. Toppozada, A., Abdallah, S., and Eldefrawi, M. E. 1966. Chemosterilization of larvae and adults of the Egyptian cotton leafworm, *Prodenia litura* by apholate,

- metepa, and tepa. J Econ. Entomol 59, 1125-1128.
- 1371 Tsao, T. F, and Chang, J T. 1966 Studies on insect chemosterilants. IV Further results on screening on insect chemosterilants, Acta Entomol Sm. 15: 13-27.
- 1372 Tung Bing. 1965 A preliminary observation on the mechanism of sterilization of the houseflies (Musca vicina Macquart) treated with thiotepa Acta Entomol. Sin. 14: 250. [In Chinese]
- 1373. Turner, R. B , and Maheswary, N P 1969 Biochemical effects of apholate on mosquito ovarian tissue Ann. Entomol. Soc. Amer. 62: 1091–1095.
- 1374. Tzanakakis, M E. 1967 Control of the olive fruit fly, Dacus oleae, GMELIN, with radiation or chemical sterilization procedures, final technical report. Aghia Paraskevi Attikis, Greece, 81 pp

## U

- 1375. Ueda, S., Izutsu, M., and Ishii, S. 1969. The reproduction of the German cockroach, Blattella germanica and the effect of metepa on it. Jap. J. Appl. Entomol. Zool. 13: 70.
- 1375a. U.S. Department of Agriculture. 1967. Materials evaluated as msecticides, repellents, and chemosterilants at Orlando and Gainesville, Fla., 1952–1964. U.S. Dep. Agric, Agric, Handb, No. 340, 424 pp.
- 1376. Uspenskaya, N. V., and Vasyurin, S. T. 1970. Chemosterilant food baits as a possible method of control of the turnip moth (Agrotis seyetum). Zool. Zh. 49: 1088–1090 [In Russian.]

### $\mathbf{v}$

- 1377. Valcovic, L. R., and Grosch, D. S. 1968. Apholate-induced sterility in *Bracon hebetor*. J. Econ. Entomol. 61, 1514–1517.
- 1378. Van Der Kerk, G. J. M., and Lintjen, J. G. A. 1954. Investigations of organo-tin compounds. III. The biocidal properties of organo-tin compounds. J. Appl. Chem. 4: 314–319.
- 1379. Vaniev, A. D., Beglyarov, G. A., Khokhlov, P. S., Bliznyuk, N. K., and Markova, N. V. 1968. Chemosterilizer. Izobret., Prom. Obraztsy, Tovarnye Znaki. 45(34); 124.
- 1380. Vashkov, V. I. 1972. Ethylenimines of phosphoric acids as chemosterilizers. Angew. Parasitol. 13: 155–168.
- 1381. , Kostina, M. N., Zhuk, D. S., Andronov, V. N., and Aleksandrova, V. A. 1971. Sterihzation of insects, especially of the housefly. U.S.S.R. 324,026, Appl. 30 Nov. 1970. From Otkrytiya, Izobret., Prom. Obraztsy, Tovarnye Znaki 1972, 49: 6.
- 1382. ——, Volkov, Yu. P., Zakolodkina, V. I., Nifantyev, E. E., Sidorova, M. V., and Brzhesky, V. V. 1969. Sterilizing properties of some aziridines and esters of phosphoric acid for houseflies, 3ème Congrès Internazional des Antiparasitaires, Milan (Oct. 6-8, 1969), pp. 491–499.
- 1383. Vasyurın, S. T. 1969. The treatment of pupal integuments with chemosterilants as a way of the turnip moth sexual sterilization, Zool. Zh. 48: 443-446. [In Russian.]
- 1385. Verly, W. G. 1964. Actions mutagene et cancerigene des agents alcoylants. Rev. Fr. Etud. Clin. Biol. 9:

- 878-883.
- 1386. Vickers, D. H. 1971. Metabolism of <sup>14</sup>C-labeled tepn in the tobacco budworm moth, *Heliothis virescens*. Diss. Abstr. Int. B 32(2), 990-991.
- 1387 Vingiello, M., and Ross, M. H. 1967. Some effects of apholate on the German cockroach, Blattella yermanica, Va. J. Sci. 18; 59-62.
- 1388 Vinson, S. B., and Land, J. D. 1965. The effects of ammopterin on egg development and behavior in the house spider, *Theridion tepidariorum* Kock. Physiol. Zool, 38: 174-176.
- 1389. Vogel, E. 1971. Chemical constitution and mutagenic action. VI. Induction of dominant and recessive lethals by 1-aryl-3,3-dialkyltriazenes in *Drosophila melanogaster*. Mutat. Res. 11: 397-410.
- 1390. ———. 1972 Differential sensitivity of immature and mature occytes of *Drosophila melanogaster* to the induction of dominant lethals following treatment of monoand polyfunctional aziridine analogues, Mutat. Res. 14: 250–253.
- 1391. Voiculet, N., Chiralen, F., and Vilau, C. 1965. Distribution and metabolism of <sup>32</sup>P-labeled endoxan and TSPA, in rats. Stud. Concetari Biochim. 8: 109-119.
- 1392. Von Ehrhardt, W. 1968. Versuche mit Drosophila melanogaster und dem chemosterilans apholate. Z. PflanzenKr. (Pflanzenpathol.) Pflanzenschutz 75: 32-34.
- 1393. Vronskikh, G. D. 1971. Morphological changes in the gonads of some insects under the influence of chemosterilants. In Kishinev (ed.), Biological Methods of Protecting Fruit and Vegetable Crops From Pests, Diseases, and Weeds as Bases for Integrated Systems, pp. 154-155. V. I. Lemn Academy of Agricultural Sciences, Leningrad.
- 1394 Vronskikh, M. D., and Vronskikh, G. D. 1971. Competitive ability of sterile insects. In Kishinev (ed.), Biological Methods of Protecting Fruit and Vegetable Crops From Pests, Diseases, and Weeds as Bases for Integrated Systems, pp. 153-154, V. I. Lenin Academy of Agricultural Sciences, Lemngrad.
- 1395. ———. 1971. Some calculations for the efficiency of using sterile insects. Zh. Obshch Biol. 32: 287–298.

### W

- 1396. Wagner, N. J., and Heiderberger, C. 1962. Some effects of 5-fluoroorotic acid and 5-fluorouracil on the soluble ribonucleic acid of rat liver. Biochim. Biophys. Acta 61: 373-379.
- 1397. Walker, T. F. 1970. Studies on effects of sublethal doses of p,p'DDT on oogenesis in the housefly (Musca domestica L.) and on possible causes of abnormal oogenesis. Bull. Entomol. Res. 60: 291-302.
- 1398. Wan, T. K., and Hooper, G. H. S. 1969. Allesterase activity and reproduction in Musca domestica; effects of DDT and metepa. Entomol. Exp. Appl. 12: 221-228.
- 1399. Ward, R. A., Rutledge, L. C., and Bell, L. H. 1965. Effects of chemosterilants on the development of malarial parasites in mosquitoes. Mosq. News 25: 470-476
- 1400. Warwick, G. P. 1968. The mechanism of action of alkylating agents. Cancer Res. 23: 1815-1333.
- 1401. Waterhouse, D. F. 1965. The use of sterile insects for own destruction. Aust. J. Sci. 28; 235.

- 1402. Watts, J. G. 1969. All we know about pink bollworms. Agrichem. West 12(4), 6-7, 10.
- 1403 Wave, H. E., and Henneberry, T. J. 1967 Sterile-male releases control populations of *Di osophila melanogas*tei in cage tests. J. Econ. Entomol. 60, 1758-1759.
- 1404 Webb, R. E., and Smith, F. F. 1968 Fertility of eggs of Mexican bean beetles from females mated alternately with normal and apholate-treated males. J. Econ. Entomol. 61; 521-523
- 1405 Weidhaas, D. E. 1962. Chemical sterilization of mosquitoes. Nature (Lond.) 195, 786-787.
- 1406. —— 1963 Highlights of research on chemosterilization of mosquitoes Proceedings and Papers of the 21st Annual Conference of the California Mosquito Control Association, Inc., Dec. 21–23, 1962.
- 1407 . 1968. Field development and evaluation of chemosterilants. In G. C. LaBrecque and C. N. Smith (eds.), Principles of Insect Chemosterilization, 354 pp. Appleton-Century-Crofts, New York
- 1408 ———. 1973. Field studies on insect sterilization with mosquitoes, houseflies and stable flies. Proc. Comput. Models Appl. Sterile Male Tech., Vienna, (Dec. 18-17, 1971), p. 137.
- 1409. ——, Breeland, S. G., Lofgren, C. S., Dame, D. A., and Kaiser, R. 1974. Release of chemosterilized males for the control of Anopheles albimanus in El Salvador. IV. Dynamics of the test population and its potential for malaria transmission. Amer. J. Trop. Med. Hyg, 23, 298-308.
- 1410. ——, Ford, H. R., Gahan, J. B., and Smith, C. N. 1961. Preliminary observations on chemosterilization of mosquitoes Proc. 48th Annu Meet. N.J. Mosq. Exterm. Assoc. 48: 106-109.
- 1411. ——, and LaBrecque, G. C. 1971. Studies on the population dynamics of the housefly, Musca domestica L. Bull. WHO 43, 721-725
- 1412 ———, LaBrecque, G. C., Lofgren, C. S., and Schmidt,
   C. H. 1972 Insect sterility in population dynamics
   research. Bull. WHO 47: 309-315.
- 1413. ——, and McDuffie, W. C. 1963. Highlights of recent research on chemosterilants for the control of insects of medical and veterinary importance. Bull. Entomol. Soc. Amer 9: 268–272.
- 1414. ——, and Schmidt, C. H. 1963. Mating ability of male mosquitoes, Acdes acgupti (L.), sterilized chemically or by gamma radiation. Mosq. News 23: 32-34.
- 1415. ——, Schmidt, C. H., and Seabrook, E. L. 1962. Field studies on the release of sterile males for the control of Anopheles quadrimaculatus. Mosq. News 22: 283-291.
- 1416. Wellington, W. G. 1969. Effects of three hormonal mimics on mortality, metamorphosis and reproduction of the western tent caterpillar, Malacosoma californicum pluviale. Can. Entomol. 101, 1163-1172.
- 1417. Wheeler, G P. 1962. Studies related to the mechanisms of action of cytotoxic alkylating agents: A review. Cancer Res. 22: 651-688.
- 1418. ———. 1963. Studies related to mechanisms of resistance to biological alkylating agents. Cancer Res. 23: 1334-1349.
- 1419. White, G. B. 1964. Some observations on exposure of the aquatic stages of Aedes aegypti to the alkylating agent, thiotepa. Trans. Roy. Soc. Trop. Med. Hyg. 58: 290.

- 1420 ———. 1966. Chemosterilization of Acdes aegypti (L.) F pupal treatment. Nature (Lond.) 210: 1372-1373.
- 1421 ——. 1966 The effects of sterrhzing chemicals on the reproduction of Aedes aegypti (L.). 269 pp. Thesi University of London, School of Hygiene and Tropical Medicine.
- 1423. Whiting, A. R., and vonBorstel, R. C. 1954. Dominan lethal and inactivation effects on nitrogen mustard o *Habrobracon* sperm Genetics 39, 317.
- 1424. Whitney, D. 1966 Sterile flies used to combat Dacus. Nat Hist 75(3): 30–35.
- 1425. Whitten, M. J. 1969. Automated sexing of pupae and it: usefulness in control by sterile insects. J. Econ. En tomol. 62: 272–273.
- 1426. ——, and Norris, K. R. 1967. "Booby-trapping" as an alternative to sterile males for insect control, Nature (Lond) 216: 1136.
- 1427. Wicht, M. C., Jr., and Hays, S. B. 1967. Effect of reser pine on reproduction of the housefly J. Econ. Entomol. 60: 36-38.
- 1428. Wickramasinghe, D. N. T. 1965. Observations of the mode of action of 2-imidazolidinone, a female sterilant of adult housefly Musca domestica L. (Diptera: Muscidae). Diss. Abstr. 26: 580.
- 1429. Wiesner, B. P., Wolfe, M., and Yudkin, J. 1958. The effects of some antimitotic compounds on pregnancy in the mouse. Stud. Fertil. 9: 129-136.
- 1430. ——, and Yuddin, J. 1955. Control of fertility by antimitotic agents. Nature (Lond ) 176: 249-250.
- 1431. Wigglesworth, V. B. 1964. Hormonal control of growth and reproduction in insects: Review. Adv. Insect Physiol. 2: 247-336
- 1432. Williams, D. F., and Kuitert, L. C. 1971. Sterilization of Hippelates pusio with tepa and metepa. J. Econ. Entomol 64: 448-450.
- 1433. Williams, R. K, Brazzel, J. R, and Martin, D. F. 1958. The effect of certain organic insecticides on the mortality and oviposition of pink bollworm adults. J. Econ. Entomol. 51; 567-570.
- 1434. Wilson, J. A., and Hays, S. B. 1969. Histological changes in the gonads and reproductive behavior of houseflies following treatment with chemosterilants p,p-bis(1-aziridinyl)N-methylphosphinic amide and p,p-bis(1-aziridinyl) N (3 methoxypropyl)phosphinothioic amide. J. Econ. Entomol. 62: 690-692.
- 1435. Wiygul, G., Mitlin, N., and Thompson, A. C. 1971. Metabolism of busulfan in the boll weevil (Anthonomus grandis). Pestic. Biochem. Physiol. 1: 418-428.
- 1436. Wolfenbarger, D. A., Guerra, A. A., and Lowry, W. L. 1968. Effects of organometallic compounds on Lepidoptera, J. Econ. Entomol. 61: 78-81.
- 1437. ——, Nosky, J. B., Gonzalez, N. C., Mangum, C. L., and Borkovec, A. B. 1972. Sterilization of pink bollworms with aziridine chemosterilants and with hempa. J. Econ. Entomol. 65 962–965.
- 1438. Wollerman, E. H. 1963. Barrenness is tool in borer control. South. Lumberman 207(2585); 119–120.
- 1439. Woods, C. W. 1965. Insect chemosterilants. U.S. Pat. 3,180,792.

- Meet Amer Chem. Soc (Sept 12–17, 1965), pp 21-22A.
- 1441. ——, and Beroza, M. 1964. Antifertility composition for insects. U.S. Pat. 3,126,315
- 1442 ——, Borkovec, A. B., and Hart, F. M. 1964. Insect chemosterilants. I. N-Acylaziridines. J. Med. Chem. 7, 371–373.
- 1443. ——, and Borkovec, A. B. 1965. Dithio-bis-aziridine and 2-methyl derivative thereof. U.S. Pat. 3,197,465.
- 1444. Woolley, D. W. 1952 A study of antimetabolites. 269 pp. John Wiley & Sons, Inc., New York
- 1445 Woulfe, M. R. 1970 Reproduction inhibitors for bird control. Proc 4th Vertebr Pest. Conf., West Sacramento, Calif (March 8-5, 1970), pp. 168-170
- 1446 Wrenn, T. R., Weyant, J. R., Fries, G. F., and Bitman, J. 1971. Effect of several dietary levels of o,p'-DDT on reproduction and lactation in the rat. Bull Environ Contam. Toxicol. 6: 471-479
- 1447. Wright, J. E. 1970. Hormones for control of livestock arthropods. Development of an assay to select candidate compounds with juvenile hormone activity in the stable fly. J. Econ. Entomol. 63; 878–883.
- 1448. ——, Campbell, J. B., and Hester, P. 1973. Hormones for control of livestock arthropods. Evaluation of two juvenile hormone analogues applied to breeding materials in small plot tests in Nebraska and Florida for control of the stable fly. Environ. Entomol. 2: 69–72.
- 1449. ——, Chamberlain, W. F., and Barrett, C. C. 1971. Laboratory evaluation of insect hormones for the control of the stable fly, Stomoxys calcitrans (L). Proc. 3d Annu. Tex. Conf. Insect, Plant Disease, Weed Brush Control, Dec 15-17, 1970, pp. 52-53.
- 1450. ——, Chamberlam, W. F., and Barrett, C. C. 1971. Ovarian maturation in stable flies: Inhibition by 20-hydroxyecdysone. Science 172: 1247-1248.
- 1451. \_\_\_\_\_, and Kaplanis, J. N. 1970. Ecdysones and ecdysone-analogues: Effects on fecundity of the stable fly, Stomocys calcitrans. Ann. Entomol Soc. Amer. 63: 622-623.
- 1452. ——, McGovern, T. P., Sarmiento, R., and Beroza, M. 1974. Juvenile hormone activity of substituted aryl 3,7-dimethyl-6-octenyl ethers in the stable fly and house fly. J. Insect Physiol. 20: 423–427.
- 1453. ——, and Schwarz, M. 1972. Juvenilizing activity of compounds related to the juvenile hormone against pupae of the stable fly. J. Econ. Entomol. 65: 1644-1647.
- 1454. ——, and Spates, G. E. 1971. Biological evaluation of juvenile hormone compounds against pupae of the stable fly. Agric. Food Chem. 19(2): 289.
- 1455. ——, and Spates, G. E. 1972. A new approach in integrated control: Insect juvenile hormone plus a hymenopteran parasite against the stable fly. Science 178: 1292-1293.
- 1456. ——, and Spates, G. E. 1972. Laboratory evaluation of compounds to determine juvenile hormone activity against the stable fly. J. Econ. Entomol. 65: 1346-1349.

## X, Y, Z

1457. Yeoman, G. H., and Warren, B. C. 1965. The chemo-

- sterilisation of the sheep blowfly, Lucula secuata (Mew.) with apholate Vet Rec. 77(32) 922-928.
- 1458. Young, J. R., and Cox, H. C. 1965. Evaluation of apholate and tepa as chemosterilants for the fall armyworm. J. Econ. Entomol. 58, 883-888.
- 1459. ——, and Hamm, J. J. 1967 Reproduction of Trickogramma fasciatum in eggs from tepa-sterilized fall armyworms J. Econ. Entomol. 60: 723-734
- 1460. ——, Harrell, E. A., and Bowman, M. C. 1969. A chemosterilant feeder for insects. J. Econ. Entonol. 62, 646-849.
- 1461. ——, and Snow, J. W. 1967. Tepa as chemosterilant for the corn earworm, armyworm, and granulate cutworm. J. Econ. Entomol. 60: 1427-1430.
- 1462. ——, Snow, J. W., and Sparks, A. N. 1968. Mating of untreated and tepa-chemosterilized fall armyworm moths. J. Econ. Entomol 61: 657-661.
- 1463. Younger, R. L. 1973. Effect of three azridme alkylating compounds on the gross development of chicken embryos. Toxicol Appl. Pharmacol. 24: 423–433.
- 1464 ——, and Radeleff, R. D. 1964. The toxicological and pathologic effects of three insect chemosterilants in sheep Ann. N.Y. Acad. Sci. III 715-728.
- 1465. ——, and Young, J. R. 1963. Toxicological studies and associated clinical and hematologic effects of apholate (an alkylating agent) in sheep. A preliminary report. Amer. J. Vet. Res. 101: 659-669.
- 1466. Zakharova, N. F. 1966 Search for new chemosterilants. I. Med. Parazit. (Mosk.) 35: 515-519
- 1467. . 1969. Chemical sterilization of insects harmful to man. (A review of literature). Med. Parazitol. Parazit. Bolezn. 38: 733-739.
- 1468. ——. 1971. Testing phosphoric acid hexamethyltriamide as a chemical sterilizing agent for the housefly. Med. Parazitol. Parazit. Bolezn. 40: 21-28. [In Russian.]
- 1469. . 1972. Effect of chemosterilant hexamethylphosphamide on male and female Musca domestica L. Med. Parazitol. Parazit. Bolezn. 41: 311–314.
- 1470. Zakı, M. M., El-Ghar, M. Abo, Kamel, A. A. M., and Mitri, S. H. 1971. The effect of certain chemosterilants on the eggs and immature stages of the cotton leafworm. Bull. Entomol. Soc. Egypt Econ. Ser. 4: 71-80.
- 1471 Zaneveld, L. J. D., Robertson, R. T., and Williams, W. L. 1970. Synthetic enzyme inhibitors as antifertility agents. FEBS Lett. 11(5): 345-347.
- 1472. Zapanta, H. M., and Wingo, C. W. 1968. Preliminary evaluation of heliotrine as a sterility agent for face flies. J. Econ. Entomol. 61; 330-331.
- 1473. Zetterberg, G. 1971. Bacteriophage development in lysogenic Escherichia coli and mutations in fungi induced with analogues of tris(1-aziridinyl)phosphine oxide, TEPA. Hereditas 68: 245-254.
- 1474. Zettler, J. L., and LeCato, G. L. 1974. Sublethal doses of malathion and dichloryos: Effects on fecundity of the black carpet beetle. J. Econ. Entomol. 67: 19-21.
- 1475. ——, and LeCato, G. L. 1974. Malathion and diehlorvos: Effects on fecundity of the red flour beetle, *Tribolium castraneum* (Coleoptera: Tenebrionidae). J. Ga. Entomol. Soc. 9: 134.

## INDEX OF AUTHORS

Numbers not enclosed in parentheses show senior or sole authorship. Numbers in parentheses show secondary authorship.

Baccetti, B. 104 Abasa, R. O., 1 Bacoyannis, A., (481-484) Abdallah, S., (1370) Badger, G. M., 105 Abdellatif, M. A., 2 Badmin, J.S., 106 Abdel-Malek, A. A., 3, 4 Band, M. B., (1185) Abdel-Megeed, M. I, 5 Baker, B. R., 107, 108 Aboul-Nasr, A. E., 6 (413, 567-570) Bakry, N., (1182) Abou-Zeid, E N., (414) Baldwin, K. F., (354, 865) Abrahamsen, L. R., (403) Baldwm, R. W., 109 Actor, P, (387) Balock, J. W , (915) Adam, H. 7 Balser, D. S., 110 Adamenko, E. A., (669) Banik, U. K., 111 Adcock, P. H , (797) Bankowska, J., (1115) Addy, N. D., 8 Aditya, V., (1198-1201) Barlow, F., 112 Barner, H. D., (294) Adkms, T R., Jr., 9 (577) Barnes, J. M., 113 Adkisson, P. L., 10 Barnes, J. R , 114 Adler, I D., 11 (419) Baroche, C., 115 Adolphi, H., 12 Baroody, A. M., (945, 946) Agarwal, H. C. (886, 1099) Ahmad, A. J., 13 Barrett, C. C., (254, 255, 1449, 1450) Barsoum, H., 116 Ahmad, I., 14, 15 (1006, 1120) Bartlett, A. C., 117 (626, 628) Ailam, G., 16 Akov, S , 17-21 Barton, A. A., 118 Barton, M., (118) Al-Adil, K. M., 22 Bass, W., (419) Al-Dabagh Khudairi, S. Y., 23 Bateman, A. J., 119, 120 (258) Aleksandrova, V. A., (1381) Alekseev, A. N., 24 Bateman, M. A., 121 Batra, K. B., 122 Alexander, M. L., 25 Baumhover, A. H., 123 (600) Alexander, P., 26 Baylor, M. B., (892) Allied Chemical Corp., 27 Beam, F. D., (1330) Almeida, A. A., (315) Beard, R. L., 124 Alonso, C., 28 Beath, O. A., (1162) Altman, R. M., 29 Beattie, G. A. C., 125 Ambrose, A. M., 30-32 Ameresekere, R. V. W. E., 33, 34 Beavers, J. B., 126 Beevor, P. S., (959) Amerson, G M., (619-621) Amirkhaman, J. D., (703) Beglyarov, G. A., (1379) Beiler, J. M., (906) Anderson, E P., (201) Bell, L. H., (1399) Andronov, V. N., (1381) Anonymous, 35-45, 47-68 Bell, P. R., (697) Benes, V., 127 (1303) Ansarı, M. A., 69-77 Benkwith, K. B., Jr., 128 Armanious, N. I., (1007) Armbrust, E. J., (1285) Bennett-Rezabova, B., 129 Arnesen, J F., (950) Bensch, K. G., (894) Benschoter, C. A., 130-132 Arnold, E., (418, 419, 702) Artem'ev, V P., 78 Bergner, A. D., 133 Berin, Ye. G., 134 Arthur, B. W., (1061, 1062) Artyukhina, I. N., 79 (777) Bernard, R., (278) Ascher, K. R. S., 80-97 Berndt, K. P., 135, 136 Ashoush, I, (1323) Beroza, M., 137-139 (194, 440, 1441, 1452) Ashrafi, S. H., (1005, 1006, 1117) Berry, W. L., (1315) Atwood, K. C., (708) Berryman, A. A., 140 (281) Auerbach, C., 98, 99 (1133) Bertram, D. S., 141-144 Austin, C. R. 100 Bertram, J. S., (701) Berube, J. A., (1272) Bhalla, O. P., 145, 146 Bhanu, D., 147 Bhatnagar-Thomas, Prem Lata, 148

Bichuk, Yu. P., 149 (1090)

Bickley, W. E., (986) Butylo, T. A , 225 Bieber, L. L., (1208) Buxton, J. A., (1153) Bierl, B A., (1021) Byrdy, S., 226, 227 Bigley, W. S., (1104) Campbell, J. B., (1148) Bing, T , 150 Campion, D. G., 228-241 (314, 984, 1048) Bird, M. J., 151 (424) Cannon, W. N., Jr., 242 Bird, O. D., (1366) Cantwell, G E., 243 Bishop, Y, (417-419, 702) Carabajal, C. A., (244) Bitman, J., (1446) Carcavallo, R U., 244 Bitter, B. A., (123) Carlisle, D. B., 215 Blair, D. G. R., (741) Carmichael, A. G., (538) Bliznyuk, N K (1379) Carolsen, R. A., (974) Block, J., 152 Carrillo, J. L., 246 Bock, M., (680, 682) Cassidy, J. D., 247 Boctor, I. Z , (415) Castle, R. E., 248 Bogdanova, T. P., (213, 214) Cattanach, B. M., 249 Boling, J. C., (1216) Cenedella, R. J., 250 Cerny, V., (1141) Bonnemaison, M. L., 153-157 Chabra, K. S., 251 Boone, I. U., 158 Booth, B. A., (1195) Chadwick, P. R., 252 Boris, A., 159 Chamberlam, W. F., 253-257 (1449, 1450) Chambers, D. L., (956, 1242) Borkovec, A. B., 160-192 (20, 21, 125, 138, 209, 264-272, 275-277, 371-374, 376, 468, 470, 530, 752, 799, 864, 885, 887, Chandley, A. C., 258 (120) Chandra, K. R., (775) 918, 1022, 1025, 1026, 1228-1230, 1257, 1281, 1297, 1334, Chang, J. T., 259-261 (1371) 1346-1353, 1437, 1442, 1443) Chang, S. C 262-277 (178, 179, 1025, 1026, 1353) Bose, A, R., (713) Chang, T. H., (748, 753) Boston, M. D., 193, (354, 864, 865, 1071-1073, 1076, 1077) Chapman, G. A., (1104) Boswell, A. J., (1283) Bourbeau, G., (666) Chapman, H. C., (855) Chaudhary, K. D., 278 Bowerman, A. M. (203) Chaudhuri, N. K., 279 Bowman, M. C., 194 (306, 467, 798, 965, 1222-1224, 1460) Chaudhury, H S., 280 Bracken, G K., 195 Chawla, S. S., 281, 282 Brader-Breukel, L. M., 196 Chebanov, G. E., (219) Branco, F., 197 Chiang, Y. C (259-261) Bransby-Williams, W. R., 198 Braun, B. H , (271) Chikaki, H., 283 Chiraleu, F , (1391) Brazzel, J. R., (1433) Chow, Fu-Ho C., 284 Breeland, S. G., 199 (865, 1409) Christenson, L. D., 285 Bridges, R. G., 200 Chugunova, G. D., (217) Briggs, R. W., (753) Brindley, T. A., (687) Cinatl, J , (1161) Brockman, R. W., 201 Ciplea, Al. Gh , (1188) Clark, A. M., 286-288 Broersma, D. B , (868) Brooker, P. J., (503) Clark, E. G., (288) Clarke, D. A., (1091, 1092) Brookes, P., 202 Clarkson, B. D., (715) Brooks, J. E., 203 Cline, R. E., 289 Brown, A. W. A., 204 (508, 538, 768) Clower, D. F., (1299) Brown, J. R., 205 Coaker, T H., 290 Brown, R. T., (191, 275, 787, 1022-1026, 1229) Bruer, H. L., (831) Cochran, J. H., (622) Cody, C. P., (625) Bruni, R. J., (1059) Bruno-Smiraglia, C., (347, 348) Cohen, C. F., (1154) Cohen, E., 291-293 (854) Bryan, J. H., 206 Cohen, S. S., 294 Brzhesky, V. V., (1382) Collier, C. W., 295-297 (830) Buckley, S. M., 207 Collins, T. F. X., 298 Buiatii, M., 208 Combiesco, I., 299-302 (388, 416) Bull, D. L., 209 Complin, J. O., (698) Bulyginskaya, M. A., 210-219 (1212-1215, 1259) Conney, A. H., 3033 Burden, G. S., 220, 221 (1289) Coppinger, A. J., (831) Burns, J. J., (303) Corona, A. O., (862) Burton, R. L., (506) Corristan, E. C., (711) Bushland, R. C., (123) Corrivault, G. W., (665, 666, 909, 1047) Busvine, J. R., 222 Corwin, H. O., 304 Butt, B. A., 223, 224 (606-608, 947)

Dudley, F. H., (123) Cory, M., (1266, 1267) Dunn, G. L., 387 Coulon, J., 305 Duport, M , 388 (300, 301) Cousserans, J., (845) Cox, H C, 306 (1458) Dustin, P., Jr., 389 Craig, A. W., 307, 308 (681, 684, 684) Duvall, L. R., 390 Craig, G B, Ji, 309, 310, (458, 768, 1109) Earle, N W, 391 (450, 750) Cram, W. T, 311 East, J., 392-394 Creech, J. F., (749) Eaton, J , (450) Creighton, S. C., 312 Eckstein, Z., (226, 227) Cressman, A. W, 313 Economopoulos, A. P, 395-402 Critchley, B. R., 314, 315 (241) Eddy, G. W., 403 (368, 1104) Cross, W. H., (361) Edwards, L. J., 404 Crossley, M. L., (207) Edwards, R. G., (249) Crouthamel, W. G., (250) Eide, P. E., (748) Crystal, M. M., 316-345 (375, 530, 813, 814, 1027, 1230, 1342, Eisler, R., 405 1354) Ejmocki, Z., (226, 227) Cuellar, C. B., 346 Elbadry, E. A., 406 Cuthbert, E. R., Jr., (312) El-Dakroury, M. S. I., 407 Daftari, A., (305) Eldefrawi, M. E., (1182, 1370) D'Alessandro, G., 347, 348 Elder, W. E., 408 Damaskus, C. W., (852) El Ghar, M. R. Abo, 409 (406, 1470) Dame, D. A., 349-358 (865, 1207, 1280, 1409) El-Ibrashy, M. T., 410-415 (6) Danezis, J., 359 Ellis, P. E., (245) Das, M., 360 (1288) El-Moursy, A A., (571) Das, P. K., (893) El-Sharaby, A. M., (1184) Das, R. P., (713) El-Ziady, S., (571) Dass, C. M. S., (552-555) Emson, H. E., (741) Davey, K. G., (1065) Enesco, A., 416 (299-302, 388) Davich, T. B., 361, 362 (512-514, 613, 615, 616, 860, 879, 882) Epstein, S. S., 417-419 (11, 702) David, J., 363 Erakey, M. A. S., (571-574) Davidson, G., 364 Eriesson, R. J., 420 Davies, P., 365 (682) Eriksson, H., 421 Davis, D. E., 866, 367 Eschle, J. L., (784) Davis, H. G., 368 Evans, H. M., (1009, 1010) Davison, C., (1284) Ewen, Al B., (741) Dawson, J. R., (615, 617) Ezueh, M. I., 422 Dean, G. J. W. (350) Fabian, G., 423 Degheele, D., (1082) Fahmy, M. J., (425-439) DeGraw, J. I., (1266, 1267) Fahmy, O. G., 424-439 Degrugillier, M., (815, 816) Feldmesser, J., 440 de Lazlo, H., 369 Feliciangeli, M. D., 441-444 Delfin, E. D., (1035) Felix, R., 445 DeMartino, L., (159) Fellig, J., (114) DeMeo, G. M., (1172, 1175) Fels, E., 446 DeMilo, A. B., 370-377 (180, 181, 183, 273, 799, 1028) Ferrer, F. R., 447 Demkiv, L. P., 378 Ficke, F., (646) Desmukes, B, (643) Finch, S., 448 Despommier, D. D., (458) Flaks, J. C., (294) De Wilde, Jan, 379 Fletcher, B. S., (510) Deura, H., (459) Flint, H. M., 449-451 (882) Diamant, G., (536) Flippen, J. L., (1029) Dickerson, W. A., (651, 652) Ford, H. R., (351-354, 357, 358, 624, 865, 1071, 1074, 1078, 1410) Dietvorst, F. C., (931) Ford, J., (350) DiPasquo, V. J., (387) Fox, B. W., 452, 453 (307, 308, 683, 684, 1064) Dmoszynska, E., 380 Frank, I., (522) Dodgen, C. L., 381 Frazar, E. D., (602, 603) Dondale, C. D., (195) French, J., (1139) Donnelly, J., 382 Fricke, F., (646) Dorfman, R. I., 383 Fried, M., 454 Dorsey, C. K., 384 Friend, A. H., (121) Downey, J. E., 385 (295, 296) Fries, G. F., (1446) Downing, H. E., (420) Frishman, A. M., 455 Drake, G. L., Jr., 386 Fritz, H., 456

Frohberg, H., 457

Drummond, R. O., (535, 536)

Fuchs, M S, 458 (310) Gul'chinskaya, V. A., 563 Fuji'i, Y., (924) Gupta, A. P., (1330) Fujimoto, M. S. (1310) Guthrie, F. E., (447) Fujita, T., 459 Gvozdeva, I V., (777) Fye, R. L, 460-470 (181, 182, 187, 373, 376, 799, 800, 805, 807, Gwiazda, M., 564, 565 926, 1022) Gwynn, G. W., 566 Fytizas, E, 471-486 (977) Hafez, M., 567-576 Gadallah, A. I., 487-495 (735, 1056) Hair, J. A., 577, 578 Gahan, J. B., (533, 1410) Haisch, A., (1205) Gardarov, P. G., (78) Hakim, S., (122) Games, T. B., 496, 497 (737, 738) Halevy, A H., (1336) Galachtiou, C G., (585) Hamar, D. W., (284) Galley, R. A., 498 Hamilton, D. W , (831) Galun, R., (16) Hamilton, E. W., 579 (256) Gangrade, G. A., 499-502 (868) Hamilton, L. D., (1091, 1092) Hamm, J J., (1459) Garcia, R. D., (560, 561, 1050-1052) Gast, R. T., (362) Hamm, P. C., 580-583 Geering, Q. A., 503 Hampshire, F., (121) Geier, P. W, 504 Hampton, R. B., (126) Genrich, E. G., 505 Hancock, P. J., (742) Gentry, C. R., 506 Haniotakis, G. E., 584, 585 Gentry, J. W., 507 Hansberry, R., 586 George, J. A., 508 Hansen, W. H., (298) Georghiou, G. P., 509 (33, 34) Hansens, E. J., 587, 588 (1) Giannakakis, A., 510 Hanson, K. J., (284) Gilardi, R., (377) Hardee, D. D., (362, 879) Gilbert, E. E., 511 Harding, J. A., 589 Gilliland, F. R., Jr., 512-514 Harnly, M. H., 590, 591 (523-525) Gilmour, D., 515 Harrell, E. A., (1460) Glancey, B. M., 516 (624) Harrell, S., (637) Glanges, E., (25) Harries, F. H., 592-599 Glass, L. E., (663) Harris, E. J., 600 (1310) Gleich, J., (457) Harris, R. F., (831) Godan, D., 517 Harris, R. L., 601-603 Goebels, M. T., 518 Hart, F. M., (1442) Goeteyn, R., (1083) Hartwell, J. L., 604 Goldman, M. C., 519 Harwalkar, M. R., 605 (614, 1121) Goldsmith, E. D., 520-525 (590, 591) Hathaway, D. O., 606-608 (223, 224) Golomb, F. M., 526 Hayashi, S., (1180, 1181) Gonzalez, N. C., (1437) Haves, W. J., Jr., 609-612 Goonewardene, H. F., 527, 528 Haynes, J. W., 613-617 (882) Gordon, H. T., (397-402) Hays, R. L., (623, 1014, 1066) Gorzycki, L. J., (860, 1148) Hays, S. B., 618-623 (744, 745, 1427, 1434) Gouck, H. K., 529-533 (461, 462, 801, 806) Hazard, E. I., 624 Gough, D G., (1314) Hedin, P. A., 625-628 (613) Hegdekar, B. M., 629 Graham, A. J., (123) Heidelberger, C., (279, 896, 1396) Graham, H. M., (1049, 1052) Graham, O. H., 534-536 Hemsworth, B N., 630, 631 Hendricks, D. E., (562) Granett, P., (588) Granhall, I., 537 Henneberry, T. J., 632-637 (243, 660, 661, 742, 916, 1283, 1403) Henshaw, P. S., (369) Grant, G. G., 538 Hermes, P. A., (1108) Graves, J. B., (128, 1298, 1299) Grechkin, N. P., (1018) Herranen, A., 638 Herrick, R. B., 639, 640, (1252) Greenberg, B., 539 Herskowitz, I. H., 641, 642 Grosch, D. S., 540-547 (247, 447, 650, 1377) Hess, R., (456, 883) Groth, U., (136) Heston, W. E., 643 Grover, K. K., 548-555, (1097-1099, 1238) Hester, P., (1448) Gruner, Par L., 556, 557 Higdon, H, 644 Gruzova, M. N., (215) Hill, R., (361) Guarniera, D., (891, 1169) Hinton, T., 645 Guerra, A. A., 558-562, (1050, 1436) Hintze-Podufal, C., 646 Guess, W., (1012) Hirano, C., 647 (668, 1324, 1325) Guest, R. T., (915)

Hirsch, I., (94, 95)

Guille, G., (845)

Kamel, A. A. M., (409, 1470) Hitchings, D. L., 648 Kaneko, T., 707 Hitchings, G. H., (1091) Kanev, A. R., 708 Hlmak, Z , (888) Kantelin, J. P., (871) Ho. B T , (107) Kaplan, W., 709 Hodgson, E., 649 Kaplanis, J. N., 710 (1154, 1451) Hoffman, A. C., 650 Kappus, K. D., 711 Hofman, J. D. 651, 652 Kar. A B., 712, 713 Holcomb, R. W., 653 Karandemos, M. G., (1044) Hollingworth, R. M., (1236, 1237) Karle, J., (1029) Holmsen, T. W., 654 Karnofsky, D. A., 714, 715 (985) Hooner, G. H. S., 655 (1398) Kaur. D., 716, 717 Hoopingarner, R. A., (422) Kearns, D. R., 718 Honkins, D. E., (123, 257) Keeler, H. V., (298) Hora, J., 656, (1141) Keiser, I., 719, 720 Horwitz, S B., 657 (178) Keller, J. C., (361, 802, 1103) House, V S., (859) Kenaga, E. E., 721-724 Howard, W. E., 658, 659 (420, 902-904) Kendle, K. E., 725 Howell, J. F., (223, 224) Khaire, S. N., (605, 1121) Howland, A F , 660, 661 Khan, M. A., 726 (75) Huddleston, P. A. (361, 362) Khan, N. H., (76, 988, 1120) Hudson, C. B., 662 (1101) Khokhlov, P. S., (1379) Hughes, A. M., 663 Khomenkova, K. K., (1090) Hunter, P. E., 664 (1263, 1264) Khvatova, L. P., 727 (776) Huot, L., 665, 666 (282, 909) Kido, H., 728 Hurst, G A, (781) Kieser, H., (457) Hurteau, G. D., (974) Kihlman, B. A., 729 Hussein, E. M. K., 667 Kilgore, W. W., 730-735 (22, 488-493, 1053-1056) Iba. M., 668 Killough, R. A., 736 Inashchenko, I. I., 669 Kilpatrick, J. W., (972) Iqbal, M. Z., (633) Kimbrough, R. D., 737, 738 (496, 497) Ishii, S., (1375) King, R. C., 739, 740 Iskvarina, S. S. (217) Ivanova, T V., 670 (216-218) Kirk, H. D., 741 Kishaba, A. N., 742 (632, 633, 635) Izutzu, M., (1375) Jackson, H, 671-674, 676, 677, 679-686 (119, 152, 307, 308, 365, Kishin, A. F., 743 Kissam, J. B., 744, 745 452, 453, 630, 631, 1064) Kitagaki, T., (1003) Jackson, R D, 687 Kıtaoka, S., 746 Jackson, W. B., 688 Kitzmiller, J. B., (768, 1335) Jacob, D , (975) Klassen, W., 747-753 (449-451, 823, 882, 1136) Jacob, J., 689 Jachde, M., (1339) Klingler, B. B., (633) Jakob, W. L., 690 Kloft, W., 754 Jalil, M , 691-694 Knapp, W A., Jr., (1257) Jamnback, H., 695 Knight, S. G., (923) Jasper, R. L., 696 Knipling, E. F., 755-769 (817) Jayaraj, S. (785) Knutson, H., 770, 771 Jayasekera, R. D. E., 697 Kohls, R. E., 772 Jeffery, G., (199, 354, 865) Koike, H., 773 Jeppson, L. R., 698 Kojima, K., (1003) Jesser, M. J., (698) Kolomijtseva, I. K., (786) Jobsen, J. A., 699 Konecky, M. S., 774 (948, 949) Johansen, C. A., 700 Kopacz, B. M., (386) Johnson, D. W., (974) Kornev, K. A., (1090) Jones, A. R., 701 Koshy, T., 775 Jones, R. L., (1290) Kostina, M. N., (1381) Jones, S. L., (1147) Kozuma, T. T., (1310) Joshi, S. R., 702 (419) Kressin, E I., (449, 451) Jost, E . 703 Krishnaswami, S., (1304) Joyner, S. C. (1154) Kropachova, A. A., 776, 777, (102, 1213-1215, 1259, 1313) Judson, C. L., 704 Krzeminska, A., 778, 779 Kaiser, R., (865, 1409) Kuh, E., (207) Kalmoucos, P. E., (1040, 1042) Kuipers, J., 780 Kaloostian, G. H., 705, 706 Kuitert, L. C., (1432) Kamasaki, H., (720) Kulkarni, P. G., 781

Kung, K S, 782, 783 MacCuarg, R D , (407) Kunz, S E, 784 McDonald, F J D, (125) Kuppuswamy, N. T., 785 McDonough, L. M., (893) Kuzin, A. N., 786 McDuffie, W. C., 875 (1413) Kwasnik, H. R., 787 McE. Kevan, D K (4) LaBrecque, G. C., 788-810 (139, 182, 183, 187, 461-468, 531, 532, McFadden, M. W , 876-878 783, 926-930, 965-970, 987, 1057, 1128, 1238, 1281, 1411, 1412) McGovern, T. P. (1452) LaChance, L. E , 811-824, (345, 545, 853, 1058) McGovern, W. L., 879 (634, 636, 916) Ladd, T. L., Jr., 825-831 Macha, J., 880, (910) Lal, O. P., 832-834 McGuire, J. U , (769) Lancaster, J. L., Jr., 835 McHaffey, D. G., 881, 882 (192, 374, 1024, 1352) Land, J. D. (1388) Machemer, L., 883 Landa, V., 836-838, (911-913, 922, 939, 1016, 1141-1143) Mackenzie, P K. I., (355) Lang, J. T., 839, 840 McKibben, G. H., (361, 362) Langenscheidt, M., 841, 842 Mackintosh, D., (418) Largman, T., 843 McLaughlin, J. R., 884 Lavagnino, A., (347, 348) McVeigh, L J., (245) Laven, H., 844, 845 (768) Madhukar, B V. R., 885-887 (1100) Lawley, P. E., (202) Madlafousek, J., 888 Lawson, F. R. 846 Maehashi, H., 889 Lazarus, A., (725) Maes, J. P., 890 Leary, J. S , Jr , (696) Magaudda, P. L., 891 (1169) Leasure, J. K., 847, (654) Magerat, A., (890) Le Bras, S., 848 Magrone, R., (1170, 4177-1179) LeCato, G. L., (1474, 1475) Maheswary, N. P., (1373) Lee, J. M., (1250) Mahler, H R., 892 Lee, L. J., (1286) Mahoney, J. B. (1111) Lee, W W., (108) Maitlen, J. C, 893 Lee, W.-Y., 849 Malawista, S. E, 894 Lemin, A. J., 850 (772) Malicki, J, (380) Lemonde, A., (278) Mahk, M. M., 895 Leopold, R. A., 851 (818) Maller, R. K., 896 Lesh, J. B., 852 Mandel, H G., 897 Leverich, A. P., 853 (815, 816, 819-821) Mangum, C L., (1437) Levinson, H. Z., 854 (291-293) Manna, G. K., 898 Lewallen L. L, 855 Marei, N M., (488, 493) Markova, N. V , (1379) Lewis, C. T., (240) Lewis, W. J., 856 (1291) Marley, P. B, 899 Marsh, R. E., 900-904 (420, 659) Lichenstein, J., (294) Limburg, A. M., (179) Martin, A. O., 905 Martin, D. F., (1051, 1052) Lin, J. C-H., (544) Martin, G. J., 906 Lin, F.-J., (849) Martinez, A. P., (108) Lindquist, A. W., 857, 858 Martirosyants, V. I., 907 Lindquist, D. A., 859, 860 (361, 1147, 1148) Masner, P., 908-913 Linkfield, R. L., 861 Mason, H. C., 914-918 (634) Lipa, J. J., (1114) Massasso, J., (439) Loaeza, R. M., 862 Massie, H. R., (1185) Lobbecke, E. A., 863 Mastrilli, M. L., (1172, 1173, 1175) Loeb, M. R., (294) Mathis, W, 919 Lofgren, C. S., 864, 865 (193, 199, 354, 624, 1071-1078, 1222, Matolin, S., 920-922 (837, 1036) 1223, 1409, 1412) Matsumura, F., 923 (751) Lopez, D. F., (1242, 1248) Mattson, V. J., (598) Loveless, A., 866, 867 Matsuzawa, H., 924 Lowry, W. L., (1436) Mayer, M. S., (860) Luckman, W. H., 868 Mazomenos, B., (485) Luitjen, J. G. A., (1378) Mehrotra, K. N., 925 Lukasiewicz, A., 869 Meifert, D. W., 926-930 (530, 533, 803-809, 970) Lukefahr, M. J., 870 (562, 1050) Meisner, J., (92, 95) Lutz-Ostertag, Y., 871 Meklonian, T. M., (102) Lydin, L. V., (606-608) Meltzer, J., 931, 932 Lyon, R. L., 872 Mendoza, C. E., 933, 934 McCann, T., (975) Merkl, M. E., (362) McClennan, E. S., (736) Merola, A. J., 935 McCray, E. M., Jr., 873, 874 (972)

New, W. D. (123) Mescher, A. L., 936 Newallis, P. E , (843) Mettrick, D. F., 937 (1063) Metwally, M. M., 938, 939 Newell, G. W., (1270, 1271) Millar, E. S., 910 Newton, D. W., 1014 Miller, D. A., (1285) Nifantyev, E. E. (1382) Miller, R. W., 941 Nissim, S , (95, 97) Norland, J. F., (449, 451, 752, 753, 1136) Miller, S., 942 (1086) Mills, G. D , Jr., (1135) Norris, K R., (1426) Mims, I. S, (623) North, D T., 1015 (823) Nosky, J. B., (1437) Mirumachi, M., (1326) Mitchell, E. B , (361, 362) Novak, V., 1016 Mitchell, W. C., (600, 1310) Nuretdinov, I. A., (1013) Mitchener, M., (1209) O'Connell, P W., (772) Mitlin, N., 943-949 (117, 614-617, 626-628, 774, 781, 882, 1435) O'Dell, C. A., (1249) Mitri, S. H., (409, 1470) Odintsov, V. S., 1017 Ogata, K., 1018, 1019 Mitrovic, M., (114) Oleshchenko, I. N., (78) Mittler, S., 950 Mkı tumyan, K. L., (102, 103) Oliver, J. E., 1020-1034 (21, 274, 275, 376, 469, 787) Mohammed, A., (13) Ohver, J H, Jr., 1035 Mohuddin, S., 951-953 (1117, 1118) Omar, M. S., (575) Monto, J., 954, 955 Ondracek, J., 1036 Monroe, R. E., 956 Ondrej, M., (439) Montag, B J., (279) Orphanidis, P. S., 1037-1044 Montgomery, J. A., 957 Ortega, A., (246) Moore, R. F., 958 Osborn, A. W., (1254) Osman, M. F., (571-575) Moore, R. W., (1106) Moorhouse, J. E , 959 Oster, I. I., 1045, 1045a (1293) Moreno, D. S., (126) Ottoboni, A., 1046 Morgan, P. B., 960-970 (467, 468, 807, 929, 930) Ouellet, I., 1047 Morgan, J., Jr., (466, 800) Outram, I., 1048 (238, 239) Moriarty, F., 971 Ouye, M. T., 1049-1052 Morii, T., (746) Padovani, I., (391) Morlan, H. B., 972 Page, E. C., (702) Morris, J. M., 973-975 Painter, R. R., 1053-1056 (22, 489-493, 732-735) Morrison, P. E., (691-694) Pal, R., 1057 (769) Moscowitz, J., (92, 96) Palmquist, J., 1058 Paniagua, R. G., (132) Mouchet, J., 976 Mount, G. A., (1288) Pant, N. C., (499-502) Mourikis, P. A., 977 (1081) Papanastassiou, Z. B., 1059 Msangi, A S., (144) Papiyan, R. F., 1060 Mueller, H. P., 978 Parish, J. C., 1061, 1062 Mukherjee, M C., 979 Parizek, J., (888) Mulla, M. S., 980-983 Parker, R. P., (207) Murdie, G., 984 Parnell, J. R., 1063 (937) Murphy, M. L., 985 Partington, M., 1064 (453, 685) Murray, W. S., 986 Parsons, J. H., (503) Murvosh, C. M., 987 (970) Partridge, M. W., (109) Musharraf, A. A., 988 Paschke, J. D., (1237) Patchin, S., 1065 Mustafa, M., 989 Nadkami, M. V., 990 (1284) Pate, B. D., 1066 Nagasawa, S., 991-1001 (184, 185, 1002, 1004, 1253) Paterson, A. R. P., 1067 Naidu, M. B., (989, 1087, 1329) Patsacos, P. G., (1041-1043) Nair, K. K., (718) Patterson, J. W., 1068 Nakajima, M., (459) Patterson, N. A., 1069 (1093) Nakayama, I., 1002-1004 (184, 999-1001) Patterson, R. S., 1070-1078 (193, 798, 1224, 1238) Naqvi, S. N. H., 1005, 1006 (1118) Patton, W. P., (1243) Nassar, S. G., 1007 Pausch, R. D., 1079, 1080 Pelekassis, C. E. D., 1081 Nayar, J. K., 1008 Nayar, K. K., (1110) Pelerents, C., 1082, 1083 Nelson, N. M., 1009, 1010 Perje, A., 1084 Nelson, W. O., 1011 (1225) Perkerson, F. S., (386) Nematollahi, J., 1012 Perlman, D., (1151) Nepoklonov, A. A., 1013 Perrin-Walkdemar, C., 1085 Nesbitt, B. F., (959) Perron, J. M., (282, 1047)

Perry, A. S., 1086 (942). Roach, S. H., 1153 Pershad, S. B., 1087 Robbins, W. E., 1154 (391, 710, 956) Persin, S. A., 1088 Robertson, R. T., (1471) Persoons, C. J., 1089 Robinson, A. G., 1155-1157 (145, 146) Peters, D. C., (934) Robson, J. M., (99) Petrukha, O. I., 1090 Rodriguez, R., (145) Petty, D M, (831) Rodriguez, Y. J., (246) Philips, F. S., 1091, 1092 (1364, 1365) Roe, F. J. C., 1158 Philips-Roxane, N V , (932) Rohrborn, C., 1159, 1160 Pickett, A. D., 1093 Roessner, P., 1161 Pillai, M. K., 1094-1100 (548-555, 885-887) Rogers, B. S., (158) Pino, J. A., 1101 (662) Ronchi, V N., (208) Pin T'eng, 1102 Rooms, M. W., (953) Piquett, P. G., 1103 (949) Rosenfeld, I., 1162 Plapp, F. W., Jr., 1104 Ross, M. H., (1387) Plasket, E. I., (830) Ross, W. C. J., 1163 Plus, N., 1105 Roth, A R., (403) Pollard, M., 1106 Rowe, F. P., (725) Pollock, J. N., 1107 Ruber, E., (23) Pomonis, J. G., 1108 Rubio, R. E. P., (877, 878) Pooley, E., (1045, 1045a) Rukawischnikov, B. I., 1164-1167 Powell, J. R., 1109 Ruth, J. M., (1021) Prabhu, V. K. K., 1110 Rutledge, L. C., (1399) Prager, J. C., 1111 Rye, J. R., (928) Prokopy, R. J., 1112 Sacca, G., 1168-1179 (891) Protsenko, L. D. (1090) Saito, K., 1180, 1181 Proverbs, M. D., 1113 Salama, A., 1182 Prudhomme, J. C., (909) Salama, H. S., 1183, 1184 (567-570) Pruszynski, S., 1114 Samis, H. V., 1185 Przezdziecki, Z , 1115 Samson, M. V., (1304) Qureshi, S. A., 1116-1118 (951-953) Sandesco, I., 1186-1189 Radeleff, R. D., (1464) Sang, J. H., (740) Radwan, H. S. (406) Sannasi, A., 1190 Rageau, J., (976) Sanyal, S. N., 1191-1194 Raghuwanshi, O. P., 1119, 1120 Sarmiento, R., (1452) Rahalkar, G. W., 1121, (605) Sartorelli, A. C., 1195 Rai, K. S., 1122-1127 (936, 1239, 1240) Sato, H., (894) Rajadhyaksha, N., (1344) Saxena, S. C., 1196-1202 Rajagopalan, P. K., 1128 Sazonov, N. V., (1313) Rajapaksa, N., (1288) Scales, A. L., (860) Rakhit, S., (111) Schaefer, C. H., 1203, 1204 Ramarao, G., (11) Scherney, F., 1205 Rapoport, I. A., 1129, 1130 Schmeer, M. R., 1206 Rasheed, S., (1005, 1006) Schmidt, C. H., 1207 (349, 356, 1343, 1412, 1414, 1415) Ratcliffe, R. H., 1131 (1151) Schmitt, J. B., (1289) Ratnayake, W. E., 1132 Schneider, E. L., (719) Raulston, J. R., (562) Schnieden, H., (686) Rebois, R. V., (440) Schoof, H. F., (873, 875, 919) Reddi, O. S., 1133 Schroeder, F., 1208 Redfern, R. E., 1134, 1135 Schroeder, H. A., 1209 Redfearn, N. L., (1023) Schumakow, E. M., 1210-1215 Redmond, R. D., (700) Schuster, M. F., 1216 Reid, W. J., Jr., (312) Schwartz, P. H., Jr., 1217, 1218 Reineeke, L. H., 1136 Schwarz, M., (1463) Retnakaran, A., 1137-1139 Schwerdtfeger, F., 1219, 1220 Rezabova, B., 1140-1145 (836, 838, 1016) Scirocchi, A., (1170-1175) Ricketts, J., (200) Seabrook, E. L., (1415) Riddiford, L. M., 1146 Sears, E. R., (1233) Ridgeway, R. L., 1147, 1148 Seawright, J. A., 1221-1224 (798) Riedel, Von Martin, 1149 Seeger, D. R., (207) Riemann, J. G., 1150 (824) Segal, S. J., 1225 Ristich, S. S., 1151 (248, 1131) Sehnal, F., (939, 1294) Riviello, M. S., 1152 (1243-1248) Sekun, N. P., 1226 Rizk, G. A., (576) Serebrovsky, A. S., 1227

Srivastava, A. S., 1305 Setla, G. R., (925) Srivastava, S. C., (144) Settepani, J. A., 1228-1232 (186, 187) Staal, G. B , (1007) Sevacherian, V , (34) Stafford, E. M., (494, 495, 728) Severson, R. F., (1108) Staley, D. H., 1306 Shafner, H., (418) Stamler, F. W , 1307 Shah, V. C., (886) Starr, T. J., (1106) Shama Rao, H K, 1233 Steinberg, K , (418) Sharma, N., 1234 Steinberger, E., (1011, 1251) Sharma, V P, 1235-1240 (1127) Stemer, L. F., 1308-1310 (600, 720) Shaw, J. G., 1241-1248 (1152) Stella, E., (1174-1179) Shealy, Y F , 1249 Stepanova, M. N., 1311-1313 (777) Shehata, N. F., (6, 413) Sternberg, S. S., (1091, 1092) Shellenberger, T E, 1250 (1266, 1267, 1270, 1271) Steve, P. C. (716) Sherman, J. K , 1251 Stevens, M. F G., (109) Sherman, M., 1252 (639, 640) Stimmann, M W., 1314, 1315 (637) Shiba, M., (996-998) Stock, C. C , (207) Shimizu, H., (1004) Stokes, J. B., (1024, 1026, 1031-1034, 1231, 1232) Shmohara, H., 1253 (185, 991-995, 996-998) Stueben, M., 1316 Shipp, E., 1254 Sturelid, S., 1317 Shive, W., 1255, 1256 Sturtevant, J., 1318 Shorey, H H, (635) Sturtevant, M., (1366) Shortmo, T. J., (947, 1154) Subramanian, T. R., (785) Shott, L. D., 1257 Sugai, E., 1319-1328 Shumakov, E. M., 1258, 1259 Sukhova, M. N., (777) Sidorova, M. V., (1382) Sukumar, K., 1329 Silvers, E. L., (696) Sullivan, R. L., (545) Simco, J. S. (835) Sullivan, S., (381) Simkover, H. G., 1260 Sutherland, D. J., 1330 Simpson, H R., 1261 Sutter, G. R., (579) Simpson, R. G., (884) Suzuki, S., (1327) Singh, O. P., 1262 Suzuki, T., (1019) Skelton, T. E., 1263, 1264 Swailes, G. E., 1331 Skinner, C. G., (1256) Sweeley, C. C., 1332 Skinner, G., (448) Swilley, E., (851) Skinner, W A., 1265-1271 (108, 1250) Skul'skaya, N. Ya, (1090) Sykhova, M. N., (1313) Slama, K., (911-913) Szybalski, W., 1333 Sloan, C E, (616, 617) Taber, S., III, 1334 Smith, B. C., 1272 Tabor, L. A., (956) Smith, C. N., 1273-1281 (538, 768, 797, 808, 809, 929, 970, 987, Tadano, T., 1335 Taft, H M., (958) Smith, F F, 1282, 1283 (636, 914-918, 1404) Tahori, A. S., 1336 Smith, J. L., (290) Takahashi, T., 1337 Smith, P. K., 1284 (990) Tamaki, G., 1338 Smith, R H, (544) Tanaka, I., (1018, 1019) Smith, R. K., 1285 Tanami, Y., (1106) Smith, W. W , 1286 Tanıkella, T., (111) Smittle, B. J., 1287-1289 (221) Tardif, R., (297) Snow, J. W., 1290, 1291 (1461, 1462) Taylor, K. B., (281) Snyder, L. A., 1292, 1293 Telford, J. M., (725) Socha, R., 1294 Tempel, K., 1339 Sochilin, E. G., (563) Tenhet, J. N., 1340 Solomon, J. D., 1295 Teotia, T. P. S., (1262) Sonnet, P. E., 1296, 1297, (1030, 1135) Terranova, A. C., 1341-1343 (1108) Sorm, F., (1141) Terriere, L. C., 1344 (242) Soto, P. E., 1298, 1299 Terry, P. H., 1345-1354 (184, 188, 269, 272, 276, 277, 470, 615) Soultanopoulos, C. D., (1044) Teterovskaya, T. O., (777) Sparks, A. N., (1291, 1462) Thiersch, J. B., 1355-1365 Spates, G. E., (1454-1456) Thompson, A. C., Jr., (625, 1435) Speier, J. L., (847) Thompson, M. J., (391, 710, 1154) Spishakoff, L. M., (1243, 1248) Thompson, R. Q., 1366 Sprenkel, R. K., 1300 Thorpe, D. R., 1367 Sram, R. J., 1301-1303 (127) Tieu, V., (1188, 1189) Sriharan, T. P., 1304 Tieman, C. H., (1204)

Waterhouse, D. F., 1401 Timmis, G. M., 1368 Watts, J G., 1402 Tipnis, H. P., 1369 Wave, H E, 1403 Toba, H. H., (126, 742) Webb, R E., 1404 Tobias, E. B., (524, 525) Weidhaas, D. E., 1405-1415 (199, 358, 810, 865, 875, 1074, 1076, Tokareva, T G., (24) Tong, E , (108) Wellington, W. G., 1416 Tong, H. C., (1268-1271) Toppozada, A., 1370 Wellso, S. G., (10) Wentworth, B. C., (717) Township, R., (850) Wevant, J. R., (1446) Trains, E. G., (990, 1284) Wheeler, G. P., 1417, 1418 Treece, R. E., (839, 840) White, E., (1059) Trmal, T., (159) White, G. B., 1419-1422 Trujillo, G. P., (1248) Tsao, T. F., 1371 White, L. D., (224) Whiting, A. R., 1423 Tsao, T. P., (261) Tshugunova, G. D., (218) Whitney, D., 1424 Whitten, M. J., 1425, 1426 Tsuji, H., (459) Wicht, M. C., Jr., 1427 Tung Bing, 1372 Wickramasinghe, D. N. T., 1428 Turnbull, J. D , (935) Wiesner, B. P., 1429, 1430 Turner, C. R., (112) Wigglesworth, V. B., 1431 Turner, E. C., Jr., (578) Wilder, W. H., (855) Turner, R. B., 1373 (129, 1144, 1145) Turnov, I. S., (24) Wiles, W. G., (599) Williams, C. M., (1146) Tzanakakis, M. E., 1374 (486) Williams, D. C., (1368) Uchino, T., (1328) Williams, D. F., 1432 Udall, R. H., (284) Williams, D. L., (158) Uebel, E. C., (941) Williams, R. K., 1433 Ueda, S., 1375 Williams, W. L., (1471) U. S. Department of Agriculture, 1375a Wilson, A. G. L., (504) Uspenskaya, N. V., 1376 Vail, P., (660, 661) Wilson, J. A., 1434 (745) Wingo, C. W., (1472) Valcovic, L. R., 1377 (546, 547) Wiygul, G., 1435 (626-628) Vallance, D. K., (725) Wolf, W. W., (1315) Van Der Kerk, G. J. M., 1378 Vaniev, A. D., 1379 Wolfe, M., (1429) Wolfenbarger, D. A., 1436, 1437 (560-562) vanWagenen, G., (973-975) Wollerman, E. H., 1438 Vashkov V. I., 1380-1382 Woods, C. W., 1439-1443 (189-192, 268-273, 277, 615) Vasyurin, S. T., 1383, 1384 (1376) Woodard, D. B., (357, 358, 624) Verly, W. G., 1385 Woolley, D. W., 1444 Veselkin, G. A., (1013) Woulfe, M. R., 1445 Vickers, D. A., (626, 628) Vickers, D. H., 1386 Wrenn, T. R., 1446 Wright, J. E., 1447-1456 Vilau, C., (1391) Yasuno, M., (1128) Vingiello, M., 1387 Yeadon, R., (959) Vinson, S. B., 1388 Yendol, W. G., (1300) Vlahakis, G., (643) Yeoman, G. H., (1457) Vogel, E., 1389, 1390 Young, J. R., 1458-1462 (306, 506, 856, 1290, 1465) Voiculet, N., 1391 Younger, R. L., 1463-1465 Volkov, Yu. P., (1382) Yudkin, J., (1429, 1430) von Borstel, R. C., (863, 1423) Yusitov, N. I., (786) Von Ehrhardt, W., 1392 (1220) Zakharova, N. F., 1466-1469 Vronskikh, G. D., 1393 (219, 1394) Zaki, M. M., 1470 (409) Vronskikh, M. D., 1394, 1395 Zakolodkina, V. I., (1382) Wadhwani, K. M, (77) Zaneveld, L. J. D., 1471 Wagner, N. J., 1396 Zapanta, H. M., 1472 Wahab, M. A., (576) Zaylskie, R. G., (1108) Walker, T. F., 1397 Zdarek, J., (913) Walpole, A. L., (685) Zeidler, G., (1336) Wan, T. K., 1398 Zetterberg, G., 1473 Wang, Y.-H., (849) Zettler, J. L., 1474, 1475 Ward, R. A., 1399 Zhuk, D. S., (1381) Ware, G. W., (1367) Zidan, Z. H., (5) Warren, B. C., (1457) Zudova, Z., (1302, 1303) Warwick, G. P., 1400

# INDEX OF ARTHROPODS EVALUATED WITH CHEMOSTERILANTS

Acaearenea tepidariorum (comb-footed spider), 195 Acanthoseclides obtectus (Say) (bean weevil), 1036 Acheta domesticus (L.) (house cricket), 404 Acyrthosiphon pision (Harris) (pea aphid), 145, 146, 1155-1157 Acdes acgupti (L.) (yellowfever mosquito), 17-19, 29, 141, 111, 349, 357, 403, 458, 508, 516, 549, 624, 704, 711, 751, 885-887, 936, 951, 972, 1005, 1068, 1076, 1096, 1100, 1109, 1122-1125, 1127, 1221, 1234, 1239, 1240, 1278, 1330, 1414, 1419-1422 Agriotes litigiosus (click beetle), 669 Agrotis segetum (turnip moth), 670, 1376, 1383 Alabama argillacca (Hülmer) (cotton leafworm), 409, 410, 1470 Aleurocanthus woglum Ashby (citrus blackfly), 1242 Anastropha ludens (Loew) (Mexican fruit fly), 130, 132, 265, 583, 876-878, 1152, 1242-1248, 1308 Analis mali Auct, 1272 Anopheles albimanus Wiedemann, 199, 354, 864, 865, 1222, 1223, 1409 Anopheles gambiae, 141, 206, 346, 364 Anopheles labranchiae atroparvus, 347, 348, 1186, 1188, 1189 Anopheles pharoensis, 567, 569, 570 Anopheles quadrimaculatus Say (common malaria mosquito), 349, 358, 1077, 1207, 1415 Anthonomus grandis Boheman (boll weevil), 65, 117, 192, 209, 361, 362, 374, 391, 450, 512-514, 613-617, 625-628, 750, 752, 753, 764, 781, 859, 860, 879, 881, 882, 958, 1024, 1136, 1147, 1148, 1216, 1341, 1352, 1435 Aphis craceivora Kock (cowpea aphid), 785 Aphis fabae Scopoli (bean aphid), 832, 834 Aphis mellifera (L.) (honey bee), 700, 1334 Appleworm, 225 Attagenus piceus (Olivier) (black carpet beetle), 1474 Autographa gamma (silver Y moth), 237 Blattella germanica (L.) (German cockroach), 79, 221, 455, 778, 1196, 1287, 1289, 1375, 1387 Bomby, e mori (L.) (silkworm), 647, 1146, 1319-1328 Boophilus annulatus (Say) (cattle tick), 535, 536 Boophilus microplus (Canestrini) (southern cattle tick), 746 Brachurhanus sulcatus (F) (black vine weevil), 311 Bracon hebetor (Say) (a wasp), 540, 541, 544-547, 650, 820, 822, 1058, 1377, see also Habrobracon juglandis Bruchus chinensis (seed-eating weevil), 148 Cadra cautella (Walker) (almond moth), 499-502 Callosobruchus chinensis (Azuki bean weevil), 184, 185, 991-1000, 1002, 1253 Carpocapsa pomonella (L.) (codling moth), 103, 211-214, 223, 224, 504, 563, 596, 606-608, 893 Ceratitis capitata (Wiedemann) (Mediterranean fruit fly), 719, 720, 1037, 1038, 1041, 1043, 1044, 1205, 1309 Ceratophyllus consimilis (a flea), 24 Cerura vinula (L.) (notodontid moth), 646 Choristoneura fumiferana (Clem ) (spruce budworm), 8, 1137~1139 Circulifer tenellus (beet leafhopper), 33, 34 Cochliomyia hominivorax (Coquerel) (screwworm), 49, 123, 254-257, 316, 318, 320, 321, 323-344, 375, 583, 564, 582, 756, 821, 824, 1027, 1230, 1342, 1354 Coleomegilla maculata lengi Timberlake, 1272 Common beet weevil, 1090 Conotrachelus nenuphar (Herbst) (plum curculio), 622, 1153

Cules nigripalpus Theobald, 1286 Culcs pipiens, 193, 198, 360, 538, 548, 550-555, 568-570, 703. 796, 798, 814, 873, 874, 980, 983, 986, 1070, 1072, 1073, 1075. 1078, 1097, 1098, 1099, 1119, 1128, 1173, 1180, 1181, 1224. 1235, 1237, 1238, 1288, 1335 Culey tarsalis, 855 Dacus encurbitae (Coquillett) (melon fly), 77, 103, 600, 719, 720. Dacus dorsalis Hendel (oriental fruit fly), 600, 719, 720, 1309, 1310 Dacus oleae (Gmelin) (olive fruit fly), 471-486, 584, 585, 977, 1038-1042, 1044, 1081, 1374, 1424 Dacus (strumeta) tryoni (Queensland fruit fly), 121, 510, 515 Delia brassicae Bouche, 1083 Dermacentor occidentalis Marx (Pacific Coast tick), 1035 Dermestes maculatus De Geer (hide beetle), 291-293, 854 Diabrotica balteata LeConte (banded cucumber beetle), 312 Diabrotica undecimpunctata howardi Barder (southern corn rootworm and spotted cucumber beetle), 579, 933, 934, 1263 Diparopsis castanea Hmps. (red bollworm), 229, 231-234, 237-240, 1048 Drosophila melanogaster Meigen (fruit fly), 28, 99, 114, 115, 120, 127, 134, 151, 243, 258, 286-288, 304, 363, 423-428, 430-433, 436, 439, 445, 487, 494, 495, 517, 520-525, 590, 591, 634, 611, 642, 645, 689, 709, 728, 739-741, 743, 770, 905, 914-918, 950, 979, 1001, 1004, 1047, 1085, 1105, 1133, 1159, 1185, 1190, 1292, 1293, 1301, 1389, 1390, 1392, 1403 Dysdereus cingulatus (F.) (red cottonbug), 14, 15, 75, 984, 989, Dusdercus suturellus (Herrich-Schaffer) (cotton stainer), 314, Earras insulana (Boisd.) (spiny bollworm), 5 Ephestia elutella (Hubner) (tobacco moth), 786, 1082 Emlachna varivestis Mulsant (Mexican bean beetle), 636, 1404 Epilachna vigintioctomaculata (spotted ladybird), 219 Erroschia brassicae (Bch.) (cabbage rootfly), 290, 448 Eurygaster spp. (stink bugs), 78, 1088 Feltia subterranea (F.) (granulate cutworm), 1461 Fleutiauxia armata Baly (mulberry leaf beetle), 668 Galleria mellonella (L.) (greater wax moth) 1208, 1332 Glossma morsituns (Westw.) (tsetse fly), 104, 252, 350, 352, 353, 355, 356, 1261, 1280 Gryllus assimilis (F.) (field cricket), 4 Habrobracon juglandis Ashmead (a wasp), 247, 540, 541, 544. 545, 650, 811, 863, 1423, see also Bracon hebetor (Say) Haematobia irritans (L.) (horn fly), 602, 603, 784 Heliothis armigera (Hb.) (corn earworm), 196 Heliothis virescens (F.) (tobacco budworm), 128, 449, 451, 506, 558-562, 870, 1298, 1386 Heliothis zea (Boddie) (corn earworm and bollworm), 856, 1060, 1291, 1298, 1299, 1461 Hippelates pusio Loew. (eye gnat), 981, 983, 1217, 1218, 1482 Hylemya antiqua (Meigen) (onion maggot), 868 Hylemya brassicae (Bouche) (cabbage maggot), 978, 1149, 1331 Hypera postica (Gyllenhal) (alfalfa weevil), 884, 1285, 1300 Hyphantria cunea (Drury) (fall webworm), 563 Ips confusus (LeConte) (a bark beetle), 872 Ips typographus (L.) (a bark beetle), 1219, 1220

Lasioderma serricorne (F.) (cigarette beetle), 1340

Lepidoptera spp., 157, 210, 216-218, 1213-1215, 1259, 1884, 1486

Corcyra cephalonica Staint (a moth), 147

Leptinotarsa decembineata Say (Colorado potato beetle), 226, Prionoxystus robiniae (Peck) (carpenterworm), 1295 Prodenia eridania (Cramer) (southern armyworm), 648 Lipaphis erysimi Kalt., 833 Prodenia litura (F.) (cotton leafworm), 3, 1370 Locusta migratoria migratorioides R. & F (a locust), 245 Protophorma terraenorae (bloodsucking fly), 136 Lucilia cuprina (Wiedemann) (a blow fly), 125 Pseudaletia unipuncta (Hayworth) (armyworm), 259 Lucilia sericata Meigen (green sheep blow fly), 940, 1107, Psylla pyricola Foerster (pear psylla), 705, 706 1311-1313, 1457 Pyrrhocoris apterus (L.) (pyrrhocorid bug), 880, 909, 921 Lygus hesperus Knight, 667 Rhagoletis cerasi (cherry fruit flies), 7 Macrosiphum euphorbiae (Thomas) (potato aphid), 282 Rhagoletis pomonella (Walsh) (apple maggot), 225, 1069 Malacosoma pluviale (Dyar) (western tent caterpillar), 1416 Rhodnius prolivus (assassin bug), 441-444, 1065 Manduca sexta (Johannson) (tobacco hornworm), 651, 652 Rhyacionia buoliana (Schiffermuller) (European pine shoot Musca autumnalis De Geer (face fly), 9, 384, 577, 578, 716, 717, moth), 281 736, 839, 840, 941, 1472 Rhyzopertha dominica (F ) (lesser grain borer), 148 Musca domestica (L.) (housefly), 1, 20-22, 68-74, 76, 80-82, 89, Schistocerca gregaria Forskal (desert locust), 245, 407, 718 91, 97, 124, 129, 131, 139, 150, 178, 179, 181–183, 186, 187, 200, Schizaphis grammum (Rondani) (greenbug), 1007 226, 260, 262-264, 267-273, 275, 277, 283, 289, 299-302, 349, Scolytus rugulosus (Ratzeburg) (shothole borer), 707 368, 376, 388, 416, 447, 460-470, 488-493, 505, 509, 529-533, Sitophilus granarius (L.) (granary weevil), 148 565, 571-575, 587, 588, 618-621, 623, 690, 710, 723-735, 744, Spodoptera frugiperda (J. E. Smith) (fall armyworm), 306, 1290, 745, 771, 772, 774, 779, 782, 783, 789, 790, 794, 797, 799-801, 1458, 1459, 1461, 1462 803-810, 815, 816, 818, 835, 848, 849, 851, 853, 862, 891, 919, Spodoptera spp. (cotton leafworm), 6, 406, 409-415, 576. 920, 922, 924, 926-930, 941-943, 945-949, 952, 953, 956, 1182-1184 960-967, 969, 970, 987, 988, 1008, 1022, 1053-1056, 1061, 1079, Stegobium paniceum (L.) (drugstore beetle), 148 1080, 1084, 1086, 1087, 1102-1104, 1117, 1118, 1120, 1131, Stomoxys calcitrans (L.) (stable fly), 106, 254-256, 601, 800, 1140-1145, 1150, 1168-1172, 1174-1179, 1203, 1207, 1208, 1408, 1447-1456 1234, 1264, 1270, 1311-1313, 1332, 1336, 1372, 1374a, 1381, Tenebrio molitor (L.) (yellow mealworm), 1135, 1294 1382, 1397, 1398, 1408, 1411, 1427, 1428, 1434, 1452, 1468, 1469 Tenebrionidae spp. (darkling beetles), 909 Muscina stabulans (Fallen) (false stable fly), 1311-1313 Tetranychus cumabarunus (spider mites), 2, 931, 1282, 1283 Myzus persicae (Sulzer) (green peach aphid), 599, 1338 Tetranychus telarius (L.) (carmine spider mite), 251, 664 Oncopeltus fasciatus (Dallas) (large milkweed bug), 395-402, Tetranychus urticae (Koch) (two-spotted spider nute), 242, 305, 1135, 1203 593-595, 597, 691-694, 841, 842, 1134, 1344 Ostrinia nubilalis (Husner) (European corn borer), 589, 687 Theridion temdariorum (Kock) (a house spider), 1388 Oulema melanopus (L.) (cereal leaf beetle), 422 Triatoma guasyayana Wygodzinsky y Abalos, 244 Triatoma infestans (Klug), 244 Triatoma patagonica Del Ponte y, 244

Panonychus citri (McGregor) (citrus red mite), 126, 313, 698 Papilio xuthus Linne. (smaller citrus dog), 1003 Pectinophora gossypiella (Saunders) (pmk bollworm), 10, 48, 50, 1049-1052, 1402, 1433, 1437

Pediculus humanus capitis De Geer (head louse), 1276 Periplaneta americana (L.) (American cockroach), 1089, 1110, 1196

Phaenicia cuprina (Wiedemann) (a blow fly), 968 Phorbia brussicae Bouche (cabbage maggot), 978, 1149, 1331 Phorma regina (Meigen) (black blow fly), 649, 1342 Phthorimaea operculella (Zeller) (potato tuberworm), 605, 1121 Phyllognathus silenus F., 557 Poecilocerus putus ( a grasshopper), 1196, 1198-1201 Popillia japonica Newman (Japanese beetle), 825-831 Porthetria dispar (L.) (gypsy moth), 295-297, 385

Trichoplusia in (Hübner) (cabbage looper), 632, 633, 635, 637, 660, 661, 742, 1314, 1315 Trogoderma granarium Everts (khapra beetle), 938, 939 Vicia faba (black bean aphid), 832, 834 Xenopsylla cheopis (Rothschild) (oriental rat flea), 24, 861 Zeuzera pyrina (L) (leopard moth), 776

Tribolium castaneum (Herbst) (red flour beetle), 1475

Trichogramma fasciatus (an egg parasite), 506, 1459

278, 665, 666, 937, 1063

Tricholyga bombycis (Uzi fly), 1304

Tribolium confusum (Jacquelin duVal) (confused flour beetle),

Trichogramma evanescens Westwood (an egg parasite), 506, 856

## INDEX OF OTHER ANIMALS AND PLANTS EVALUATED WITH CHEMOSTERILANTS

Acceptor is a repeator hand, 890

1 ofth 3 of out take (L)

Chickers S & View table (L)

Clain idothica areanta Sars (an ostracod), 23

Cal radia bear (a pigeon), 408, 725, 1318, 1445

Cuturne returne paparea (Temmek & Schlegel) (Japanese qual), 781–871–1250, 1252, 1270

Uguerdap is i dan O. F. Muller (an ostracod), 28

Caprimitus incompuens Ramdohi (an ostracod), 23

I'm See Van taba (L)

Trainings spp (ash trees), 727

Gastropoids See View taba (L.)

Grasses See Unin talat (L.)

Hywerolepis diminuta (Rudolphi) (rodent tapeworm), 937

Istalians paretatus (channel catfish), 381

Macaca mulata (Rhesus monkey), 712

Nematodes See Vicin taba (L.)

Plasmodium gallinaceum Brumpt (Protozoa), 29, 144, 695, 1899

Pteruleum aquilinum (brake fern), 697

Rodents See Vicia faba (L )

Schistosoma mansont, 365, 682

Sea urchins. See Vicia faba (L.)

Sheep. See Vicia faba (L.)

Shrimp. See Vicia faba (L.)

Starlings, See Vicia taba (L.)

Tetraselmis subcordiformis (estuarine flagellate), 1111

Venezuelan equine encephalomyelitis, 711

Vicia faba (L.) (broadbean vetch), 208, 832, 834, 1155–1157, 1317, and cattle, 726; and chickens, 639, 640, 662, 1404, 1339, 1463, and fish, shrimp, and gastropods, 405; and grasses, 654, and nematodes, 440, and rodents, 11, 67, 141, 143, 146, 122, 133, 152, 158, 159, 203, 205, 220, 249, 250, 284, 289, 298, 307, 367, 378, 417–421, 446, 456, 457, 496, 507, 566, 583, 630, 631, 643, 659, 663, 671, 680, 683–685, 688, 696, 702, 743, 725, 737, 738, 769, 883, 888, 889, 896, 898–904, 906, 985, 1009–1044, 1018, 1019, 1046, 1064, 1066, 1104, 1162, 1209, 1225, 1254, 1257, 1265–1267, 1302–1313, 1307, 1317, 1355–1366, 1391, 1396, 1429, 1446; and sea urchins, 453; and sheep, 1464, 1465; and starlings, 366, 1445

1		